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CONTENTS

PAGE

I. P. PAVLOV, Leningrad:
"A Contribution to the Physiology of the Hypnotic State of Dogs" 189

V. E. FISHER, New York University:
"Experimental Study of Moods" 201

ERNEST SEEMAN, Durham (N. C.):
"Development of the Pictorial Aptitude in Children" 209

H. B. FANTHAM, McGill University, Montreal:
"Charles Dickens: A Biological Study of His Personality" 222

ROBERT SAUDEK, London:
"Can Different Writers Produce Identical Handwritings?" 231

WILLIAM PLATT, London:
"'Temperament and Disposition Revealed in Young Children's Music" 246

News and Notes 252

Great Britain 252

U. S. A. 254

Scandinavia 256

Book Reviews 258

Books Received 264

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CONTENTS OF LAST ISSUE

WILLIAM MCDOUGALL (Duke University): Family Allowances as a Eugenic Measure.

JOHANNES LANGE (Breslau): Facial Lupus and Personality.

HELGE LUNDHOLM (Duke University): Laboratory Neuroses.

RAND, CANTRIL AND ALLPORT (Harvard University): The Determination of Personal Interests by Psychological and Graphological Methods.

JAN MELOUN (London): The Study of Values—Test and Graphology.

JAMES H. BARNETT (University of Pennsylvania): Personality in Primitive Society.

WERNER WOLFF (Berlin): The Experimental Study of Forms of Expression.

SOME FORTHCOMING ARTICLES

S. M. EISENSTEIN, Moscow: The Dynamics of Facial Expression.

EUGEN FISCHER, Berlin: The Psychology of South American Bastards.

O. L. HARVEY: The Measurement of Handwriting Considered as a Form of Expressive Movement.

R. SAUDEK: Handwriting of Identical Twins Reared Apart.

J. A. CRABTREE: Facial Characteristics of the Executives in a Manufacturing Business.

SANTE DE SANCTIS, Rome: Psychophysiology of Dreams.

There appear also regular Letters from England, U. S. A., Germany, Holland, Poland, Scandinavia, etc., on *Recent Research in Foreign Countries.*

A CONTRIBUTION TO THE PHYSIOLOGY OF THE HYPNOTIC STATE OF DOGS

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Assisted by DR. M. K. PETROVA

Beside the well known method of hypnotizing animals (by throwing them down on the back and keeping them for some time in that unnatural position), a hypnotization that acquires the character of catalepsy, our laboratories, while studying the normal activity of the upper regions of the brain, have been able to study also in a more detailed way the manifold and more subtle manifestations of the hypnotic state. As we have ascertained before, the fundamental factor leading to this state consists in the duration of one and the same kind of stimulation that finally brings the corresponding cells of the cortex into a state of inhibition. This inhibition shows on one hand various degrees of tension, and on the other it spreads over different sections of the cortex of the cerebral hemispheres and further down along the brain.*

Further observations reveal greater variations in the symptoms of hypnotic state, more subtle gradations of it, often barely distinguishable from a state of wakefulness, a greater sensibility of the hypnotic state to the infinitesimal changes of surroundings and to the slightest alterations of the outward stimulations to which the animal is subjected.

In the present article we will report only on the manifestations which we have been able to observe on two dogs which first served one of us (M. K. Petrova) for different investigations of conditioned reflexes, and which now are continually lapsing into the hypnotic state as soon as they are placed and fitted into the usual experimental surroundings.

In cases of conditioned food reflexes our laboratories have often

* See I. P. Pavlov, *Conditioned Reflexes, an Investigation of the Physiological Activity of the Cerebral Cortex* (London: Oxford University Press, 1927).

reported the dissociation of saliva secretion from motor food reaction which takes place when the dog falls into a drowsy condition. What actually happens is that either in the presence of our artificial stimuli or, what is more frequent, in the presence of natural stimulation (also, as has been proved, a conditioned one) by display and smell of food, the saliva begins to flow abundantly, while the animal refuses to take food. When observing the animals in that condition we have discovered highly interesting and multifarious variations of motor food reactions. They can be seen now in one animal, now in another, obviously according to the different degrees in the intensity of hypnotization. One dog, which does not lend itself to deep hypnosis, sharply manifests only that condition which with mentally diseased persons is called negativism. After a conditioned reflex has lasted some time, we offer the dog some food. It turns away from it. We draw away the plate with the food—the dog moves in that direction. We offer it again; again it turns away and moves towards it as soon as we draw it back. The reaction of turning away from the plate we call a negative one, or the first phase of negativism; the movement towards the food—a positive reaction or the second phase. And this may repeatedly happen many times until in the end the dog usually takes the food. The degree of hypnotism is expressed in the number of repetitions of this process. At the start of the hypnosis the food is taken and eaten at the second offer. When the hypnosis grows deeper both phases of negativism repeat themselves many times. At the highest point of hypnosis the dog does not take the food, regardless of how often we repeat the offer. But it suffices to dispel the hypnosis in one way or another—either by removing the apparatus attached to the dog for collecting saliva, or by disentangling the chain on which the dog is led and which during the experiment is tied to the upper beam of the stand, or in some other way—to make the dog greedily precipitate itself upon the food.

With another dog the food motor reaction manifests itself during hypnosis in a more complex manner. In this case the phenomenon appears in the following order. Under the effect of our conditioned stimuli (usually towards the end of their isolated action) the dog, if it was sitting, stands up, if it was standing, turns with all its body in the direction where food has usually been offered to it; but when it is offered, the dog draws its head aside or upwards; that is, the first phase of negativism sets in. If now the plate of

food is taken away from the animal, its head will move in the direction of the food to watch it; this is the second phase. After several repetitions of such negativism, the dog finally holds its mouth over the plate, but does not take the food, in fact, is unable to take it. It begins, apparently with a great effort, little by little to open and close its mouth frequently but, as it does not actually grasp the food, its movements are without results (abortive movements). Later on, it begins to move its jaws more freely. It now takes the food in small portions and finally grabs it very rapidly with a widely open mouth.

Thus in this phase of hypnotization we must distinguish three different states in three sections of the muscular system of the skeleton in connection with the process of taking food, viz., a strong inhibition, immobility of the muscles immediately connected with the process of eating (the masticating muscles and tongue), a considerable mobility, showing in a periodical action, in the form of negativism of neck muscles, and finally the normal action of the muscles of the remaining body. The deeper the hypnosis, the more inhibited and hindered are the nearest muscles; the tongue hangs out of the mouth as though paralyzed and the jaws remain entirely without movement. Negativism manifests itself on the muscles of the neck only in the first negative phase. Then the movements of the head stop altogether; there remains only the turning of the body under conditioned stimulation. Finally with a still deeper hypnosis this last motor reaction stops as well. All this can be dispelled in a moment with the same methods as described in the experiment with the first dog.

There is still the following to add regarding the motor food reaction. The slightest alteration in the usual appearance of the food or even in the manner of offering it turns a negative motor reaction instantly into a positive one, that is, the dog takes the food which it had rejected a moment ago. We offer it in the usual bowl, with a somewhat moist bread-and-meat powder very evenly spread over it. The dog refuses it. It suffices however to gather part of the powder into an outstanding heap and the dog will snatch it up greedily and then proceed to eat the rest. It is also sufficient to put the powder on a plate or on a paper and offer it in this way to get again a positive reaction. The dog will take the food also out of the hand, instead of the bowl, and finally, sometimes, after our conditioned

stimulus, having refused the powder in the bowl, the dog will lap up the same powder which was spilt on the floor of the stand.

In addition to these motor manifestations, connected with the process of eating, other motor reactions of a special kind, deserving attention, can be observed during the hypnotic state. Many dogs, in a state of wakefulness, after having partaken of a small experimental quantity of food, for some time lick their front paw and their chest. The dogs under hypnosis usually protract it considerably, and with one of the dogs we are here describing this condition soon acquired a peculiar character. After having licked the paw (particularly the soft part of the toes of the front paw) and covered it with saliva, the dog approaches it to the apparatus attached (stuck) to the saliva fistula and several times passes the toes across it, repeating this procedure many times, if we do not stop it. In a state of wakefulness the dog does not do this. In a state of wakefulness some dogs fight with the apparatus only when it is first attached, but ignore it once they get used to it.

One might venture to say that this is the manifestation of a special defensive reflex under the state of hypnosis. When a dog has a wound on a spot accessible to its tongue it repeatedly licks the wound —cleanses it with saliva (a therapeutic reflex). Obviously in this case the irritation caused by the paste with which the apparatus is stuck to the skin gives birth to this reflex and owing to the place of irritation the tongue is supplanted by the paw.

Many of the described varieties of the motor food reaction usually can be observed in one and the same experiment, where they swiftly follow each other. This continuous variability and mobility of the hypnotic state reveals itself also in other phenomena. We shall give several other examples of fluctuation of the hypnotic state and of changes in the effect of the conditioned stimulation, some of which were described before and were repeated in the present work, while others were observed by us for the first time in our experiments with these dogs. These fluctuations and changes may be caused by still unknown facts, or depend upon special conditions.

We point out once more that, when the hypnotization of the dog in experimental surroundings has once begun, the hypnosis takes place as soon as the dog has been placed on the stand, and sometimes even as soon as it has crossed the threshold of the room of experiment. And afterwards, during the experiments, the hypnosis grad-

ually and continually deepens if we do not introduce conditions to dispel it.

First of all, let us consider the fact of dissociation of the secretory and motor reactions of the food reflex. This dissociation often acquires the character of something like mutual antagonism; either the saliva appears at the stimulation while the motor reaction is absent, that is, the dog refuses food; or on the contrary, the dog quickly grabs and greedily eats the food while the saliva does not flow in spite of well elaborated conditioned stimulations.

I quote as a case in point the experiments with one of our dogs, Bek, which on two successive days began in the following way:

April 17, 1930

Conditioned Stimulus	Saliva in Drops for 30 Sec.	Motor Food Reaction
Toy rattle	15	Negativism, then eats.
Bell	15	Abortive movements, does not eat for a long time.

April 18, 1930

Toy rattle	1	Took the food at once, but ate lazily.
Bell	0	Took the food at once, and ate greedily.

Sometimes these antagonistic relations between secretory and motor food reactions in the course of the experiment quickly change into diametrically opposite ones.

Here is the example of John, another dog of ours:

April 12, 1930
(the beginning of the experiment)

Conditioned Stimulus	Saliva in Drops for 30 Sec.	Motor Food Reaction
Toy rattle	5	Negativism.
Bell	0	Takes the food at once.

In previous reports on experiments in our laboratories we have stated many times that a well elaborated inhibitory stimulus, usually a differential one, can change the given hypnotic state in opposite directions, sometimes strengthening and sometimes weakening it. The same we have often seen with the animals here described.

One should add that amidst our ordinary strong conditioned stimuli an exceedingly strong conditioned stimulus often dispels or

weakens the state of hypnosis, when the ordinary strong stimuli either leave it unaltered or even strengthen it.

As an example, we mention here a part of the experiment with the dog Bek the beginning of which has been cited above. After the application of a differential stimulus the medium-strong conditioned stimuli, e.g., toy rattle, gurgling sound, and bell, remained without secretory effect and the dog did not take food for a long time, making only abortive masticating movements. A hard rattle, a very strong conditioned stimulus, provoked saliva and the dog took the food after a short period of negativism.

April 17, 1930

Conditioned Stimulus	Saliva in Drops for 30 Sec.	Motor Food Reaction
Toy rattle	0	Does not take food for a long time.
Gurgling sound	0	*Idem.*
Hard rattle	5	Short negativism.
Bell	0	Does not take food for a long time.

How are we to explain the physiological mechanism of these facts? In the present state of our knowledge about the physiology of the higher sections of the brain it would be too much to expect a completely reasoned and clear answer to all questions which arise in this connection. But attempts to bring separate phenomena in agreement with some more general principles of the activity of these sections must be made continually to devise new variations of experiments with the hope better to understand the exceptionally complicated relationships of reality.

The fundamental difficulty in explaining the mechanism of these phenomena of the hypnotic state is due to the fact that during stimulations, which are doubtless directed into the cells of the cerebral hemispheres, we often do not know what in the nervous action is to be put to the account of the hemispheres and what to that of the lower centres, i.e., the lower parts of the brain and even the spinal cord. In the process of the phylogenetic development of the central nervous system, the nervous combining systems—the so-called reflectional centres—while becoming gradually definite and more complex, were carried nearer and nearer towards the brain. This development represents an increasing analysis and synthesis of the stimulating agents, which correspond to the growing complexity of the organism, and the increasing relations of the organism with the sur-

roundings in a greater area. Thus gradually, together with a more or less stereotype nervous activity, with ready-made complexes of physiological functions, roused by rare and elementary stimulations, a higher nervous activity was developed. This higher nervous activity concerns a greater number of conditions and a greater number of already complex and, at the same time, changeable stimuli.

Then the investigator is faced with the very complicated question what kind of link he has to assume between these various stages.

Reconsidering our first question of the dissociation of the secretory and motor reactions of the conditioned food reflex, we have to decide what should be put to the account of the cortex and what to that of the adjoining sub-cortex; or in other words, what is voluntary in this process and what reflex. Coming still nearer to the point: do both the secretory and motor components of the conditioned food reflex depend equally on the cortex, or is there a difference and does the motor depend chiefly on the cortex, while the secretory depends on the sub-cortex?

Let us turn to some known facts.

The phenomena of human hypnosis rather suggest that in the cortex, together with grandiose projection of the outward world through the afferent fibres (this being a necessary condition of a higher regulation of functions), there is as well a wide projection of the inner world of the organism, that is, of the conditions and functions of the whole assemblage of organs and tissues, in short, of the bulk of organic inner processes. The minute facts concerning the self-suggested "pseudo-pregnancy" are most convincing in this regard. Many processes in such passive tissues as the fat cells take place and are enhanced through the innervation coming from the hemispheres. But it is clear that in their strength these two projections greatly, nay exceedingly differ from each other. While the projection of the skeleton-muscular apparatus is highly subtle discriminative, and may be compared to that of such outward energies as sound and light, the projection of other inner processes lags strongly behind. This difference is possibly due to the insufficient practice of the latter. Anyhow, it is an established physiological fact. Evidently it is on this basis that one distinguishes the voluntary and the non-voluntary functions of the organism, the activity of the skeleton muscles only being attributed to the first. This means that the work of the skeleton musculature is determined first of all by its cortex-projection—the motor area of the cortex (motor

analyzer in our terminology) which is directly connected with all outward analyzers, and in its direction is continually determined by the analytic and synthetic work of these analyzers.

On the strength of the preceding statements we may summarize the mechanism of the formation of our conditioned food reflex as follows. On the one hand it is the connection of those cortex points which have been excited by conditioned stimuli with the reflex food centre of the adjoining sub-cortex with all its separate functions; on the other hand, it is a closer connection of these same points with the corresponding parts of the motor analyzer, i.e., with those which participate in the process of eating. Then the dissociation during hypnosis in the process of eating of the secretory and the motor components should be understood in this way: in the state of the given hypnosis the motor analyzer is inhibited, while all the other parts are free. These latter send the reflex to the food centre of the sub-cortex with all its functions, but because of the inhibition in the motor analyzer the motor component of this reflex is switched off alongside its direct line, and in the last phase of this process the cells in the ventral horns become inactive; thus all that remains of the action of eating is the apparent secretory reaction.

Now the opposite case; saliva does not flow when an artificial conditioned stimulus is applied, but there is a motor reaction, since the dog eats the food at once. The explanation is clear: this means a general slight inhibition of the whole cortex, so that the artificial stimulation alone is not sufficient to overcome the existing inhibition, and only at the offer of food, when artificial conditioned stimuli are joined with natural ones (sight and smell of food, which are stronger than the artificial stimuli), a complete reflex with both components takes place.

But there is still another case which, occurring in experiments of our laboratory other than in hypnosis, should be mentioned in connection with the aforesaid explanations. The dog eats, but the saliva does not flow for ten to twenty seconds. This must be due to the development of a special inhibition in the cortex which is caused by an artificial conditioned stimulation and lasts for some definite lapse of time.

How have we to understand this phenomenon? What is the mechanism of it? One must imagine that from the points of artificial conditioned stimuli a strong inhibition develops in the whole sub-cortical food centre with both its chief components, the secretory and

the motor, and in the corresponding section of the cortex motor analyzer. At the offer of food a rapid stimulation of the food section of the motor analyzer takes place. It originates from the points of the stronger natural conditioned stimuli which besides did not participate in the development of the inhibition. The food section of the motor analyzer is more mobile than the sub-cortical centre, in which the inhibition is dispelled only after a lengthy action of an unconditioned stimulus. Perhaps it could be, if only partially, compared with the intentional, voluntary introduction of food into the mouth, and the subsequent mastication and swallowing without experiencing appetite.

One might assume, of course, that the conditioned link between the motor reactions and the flowing of saliva takes place also in the cortex, through the cortical projection of saliva glands. Then all the cases of dissociation of secretory and motor reactions can be explained as manifold localizations of inhibition which take place at the start and during the spreading of the hypnotic state. (We have good reasons to admit such an explanation too.)

The next hypnotic manifestation, the physiological mechanism of which we must examine, is negativism. Of course it is an inhibition, because it is a phenomenon with phases which gradually end with sleep. There is also no doubt that it is a localized cortical inhibition, for through the simultaneously occurring saliva reaction a conditioned, that is, cortical activity is revealed. It thus becomes natural to conclude that it is a motor inhibition, related to the motor area of the cortex, to the motor analyzer.

How to explain the form of this inhibition? Why do we find first a negative phase of the motor act, and then a positive one? What does this change mean?

It seems to us that this phenomenon can be easily brought in agreement with some more general principles, with facts already known to us. When the hypnotic state, that is, the state of inhibition, sets in, the cortical cells are brought into a weaker, less efficient state; the degree of their possible stimulation is lowered. This is the so-called paradox phase. Then usually a strong stimulus becomes super-strong and can provoke not stimulation but inhibition, in fact can strengthen inhibition. Also, we must suppose that the movements starting from the motor analyzer consists, like all movements, of two opposite innervations, a negative and a positive one, a movement to the object and away from the object, comparable to

the relation of contractors and extensors of the extremities. Then negativism can be explained as follows: from the region of the cortex (little or not at all inhibited), the conditioned stimulus sends the stimulation to the corresponding positive innervation point of the motor area, and the latter owing to a definite phase of hypnosis is in a paradox state. Therefore this stimulation does not lead to the excitation of that point, but brings it into a still deeper state of inhibition. Then this special and localized inhibition rouses according to the rule of mutual induction the stimulation of the negative point, which is closely associated with the positive one. Thence the first negative phase of negativism.

At the removal of the stimulus, the same unusually inhibited positive point itself (because of inner mutual induction) instantly falls into a state of stimulation; moreover, the negative point, stimulated by induction, also instantly becomes unusually inhibited and in its turn positively inducts the stimulation of the positive point. Thus the positive point after its first unusual inhibition appears as doubly stimulated. Therefore usually, if the hypnosis does not go any further, after one or several offers and removals of food, the positive phase gets the upper hand and the dog begins to take the food. We have here a very labile state of cell activity as a characteristic of the transitory phase. The following course of phenomena shows that all this is correct. Further on, if the hypnotic state is strengthened, only the negative phase remains; the opposite induction becomes impossible, and further still, any stimulation of the motor innervation apparatus is eliminated altogether.

Approximately at this period of hypnosis in the conditioned food motor reaction can be observed one of the conditions which determine a fractional distribution of inhibition in the cortex. In an experiment on one of our dogs we have been able, as shown above, to observe a very interesting and singular phenomenon (already mentioned in a previous article by one of us). It was a certain consecutiveness of inhibition in the adjoining regions of the motor area.

This consecutiveness can be understood only by assuming that the inhibition sooner seizes upon that region which was more active before the hypnosis. Since the masticating muscles and the tongue have been more active at the repeated process of feeding than the neck and the body muscles, inhibition manifests itself in the same consecutiveness.

The interesting fact of positive stimulating effect during hypnosis

by the slightest alteration in the appearance of the food, and the manner of offering it, is also based on the general principles of cortical activity. Dr. G. W. Volborth of our laboratory has established long ago that a conditioned inhibition of the second order does exist, in the same way as the conditioned stimulation of the second order. This is how it manifests itself. If the elaborated inhibitory process (for instance during the differentiation of the stimuli) repeatedly synchronizes with the indifferent stimulus, the latter soon becomes an inhibitory agent. Then it is easy to understand that any stimulations of the cerebral hemispheres during the hypnosis (which is a certain degree of inhibition) also become inhibitory. That is the reason why bringing a dog into the experimental chamber sometimes by itself suffices to hypnotize it. All the new stimulations, even slight ones, do not possess this quality of inhibition and therefore do stimulate the positive activity of the cortex.

The therapeutic reflex mentioned in this article is merely one of the sub-cortical reflexes which manifest themselves during hypnosis after a short process of feeding. The partaking of food with all its stimulative components acts as a strong stimulus on a more or less hypnotized cortex, and strengthens its state of inhibition. Then a positive induction proceeds from the cortical to the sub-cortical centres, where at that moment there are sub-minimal stimulations or traces of past strong stimulations. The animal begins to sneeze, scratch, etc., which it does not do in a quite wakeful state. The experiment on the dog which can be compared with war neurosis also belongs to this category.*

About differentiations (that is, stimulations which lead to conditioned inhibition) we have known for a long time that their influence on the spread inhibition is twofold and that the two influences are directly opposed to each other. In the case of a slight hypnosis, i.e., of a slightly spread inhibition in the cortex, a well elaborated inhibitory stimulus which more or less concentrates the spread inhibition, either fully dispels the hypnosis or else weakens it. If on the other hand the inhibitory tonus of the cortex happens to be strong, then an inhibitory stimulus strengthens the inhibition, adding its own strength, as it were, to the already existing inhibition. That is, the result is determined by the proportions of the two energies.

In the last experiment described in the present paper a very

* The analysis of this case is given in an article by I. P. Pavlov published in Russian in volume IV of *Reports of Prof. I. P. Pavlov's Physiological Laboratories* (Leningrad, 1932).

strong stimulus (in contrast to medium and weak ones) often did not strengthen the inhibition, but provoked a positive action. This must be explained by the direct effect of an exceedingly strong stimulus on the sub-cortex, the strong stimulation of the sub-cortex being communicated also to the cortex and dispelling or weakening the inhibition process in it. One of our experimental methods which we often apply supports this explanation. When the uniform surroundings of the experiment begin to hypnotize some of our animals we prevent this sometimes by raising the food excitability of the dogs. This we do by reducing to a certain extent their daily portion of food. The raising of food excitability in this case is most probably localized in the sub-cortical food centre.

EXPERIMENTAL STUDY OF MOODS[1]

V. E. FISHER
New York University
and
ALFRED J. MARROW

The extremely interesting and important field of moods, their influence upon the speed and nature of our every-day reactions, has scarcely been touched upon as yet by experimental psychology. The reason for this neglect is perhaps two-fold: in the first place our moods belong to that particularly personal side of our lives, and for that reason one hesitates to intrude himself out of mere scientific curiosity, and in the second place it is difficult to obtain suitable subjects inasmuch as moods are not producible at will. It is true we can and have gone to the mental hospitals and there subjected unhappy and elated individuals to our tests; but our results are always questioned by the pathological nature of our subjects. And, although we often enough see someone on the street who looks unusually joyous or depressed, irritable, expectant, or boisterous, we cannot after all haul these individuals into the laboratory for experimental purposes. So the question has confronted us: "How may we experimentally approach the study of moods?"

To us, along with McDougall and others, it seems regrettable that one of the most widely open doors to experimental work in psychology has so long been, and continues to be, neglected. Hypnosis is not only an interesting and too little understood aspect of the domain of psychology in itself, but it opens the way to the study of many other problems in psychology to which, otherwise, the door is practically closed. At least that is the conviction of the present

[1] This study was reported in part at the Philadelphia meeting of the Association of Consulting Psychologists, May 6, 1933. We are here using the term "mood" in the sense of a relatively enduring feeling-emotion state which does not incline the individual toward any recognizable goal, or feasible line of activity, whereby he might rid himself of the tension. In short we are using the term in its every-day popular sense.

writers, and, in the present study, we have assumed that the hypnotic induction of a mood in a so-called normal subject does not in any vital respect vitiate the personality make-up or mental integrity of that individual except to bring about artificially a certain feeling-emotion orientation, an orientation, however, which might quite easily occur as the result of any one of a thousand things likely to happen in his daily life. We are perfectly aware that as long as hypnosis is not more thoroughly understood than it is, that, in other words, as long as the present controversy continues concerning its actual nature, the validity of the assumption which we have just made must remain in some doubt. We hope to lessen the importance of that assumption, however, by readily admitting that the following study is purely exploratory and in an unknown field. We think, moreover, that our results have some interest aside from any such assumption.

Purpose of Study, Subjects, Procedure. The purpose of the experiment was to observe any influence of moods of elation and moods of despondency upon the speed and quality of free-association reactions.

Seven subjects, five women and two men, all but one students in good standing at the University, were used for the experiment. We were able to induce post-hypnotic amnesia in all of the subjects.

A list of test-words was made up with a view to including four different types of words; namely, (1) words with pleasant mood-associations, (2) words with unpleasant mood-associations, (3) words with mood-associations of an unpredictable nature, and (4) words without appreciable mood-associations. This list of words was arranged in three different orders, arrangements which we shall speak of as Tests 1, 2, and 3. Each subject was given the three tests in the order 1, 2, and 3, but we varied the order of the moods for the different subjects. Thus, Subject I did Test 1 in the elated mood, Subject 2 did Test 1 in the normal mood, Subject 3 did Test 1 in the despondent mood, etc.

For the induction of the moods the following statements or "suggestions" were given to the subject twice:

For the elated mood:

> In a few minutes I will wake you up. Just as soon as you are awake the most wonderful happiness will come over you that you have ever experienced. With each minute you will grow happier and happier. Everything will be sunshine and happiness. All of the most happy mo-

ments of your life will descend upon you. All your cares will be forgotten; you will know nothing but happiness, just pure unadulterated happiness. Even the saddest thing in life will have a happy side for you. In a few minutes I will awaken you; and as soon as you are awake you will bubble like a mountain brook with sheer happiness. Happiness will well up within you; it will descend from all sides upon you; you will be the happiest person in the whole world; no one will be half as happy as you. As soon as you are awake you are going to experience the most undreamed of happiness. You are already beginning to grow happy. All of your worries and cares are already beginning to leave you. The wave of happiness is already descending upon you.

For the despondent mood:

In a few minutes I am going to wake you up. Just as soon as you are awake the most terrible depression you have ever experienced will begin to descend upon you. This terrible depression will completely engulf you; sunshine will appear as shadows and shadows will become the most despairing hopelessness. All of the unhappiness of your past life will take possession of you. There will be absolutely nothing gay or happy in life for you; everything will have but one side, a dark side, and not even a glimmer of happiness will filter into your dark despondency. In a few minutes I will wake you up, and as soon as you are awake you will feel miserable and depressed. Depression and unhappiness will engulf you; darkness will pervade your soul and everything will seem utterly futile and empty. The wave of depression is already descending upon you. You are already growing despondent and everything is growing grey and devoid of joy. Unhappiness is creeping through you; you are already growing unhappy and despondent.

The subject's reaction-time was recorded by means of a stop watch to fifths of a second. And in order to eliminate as far as possible the "personal equation," *the experimenter who gave the tests remained in ignorance of the mood sequence except when he was unable to help discerning the nature of the mood from the subject's general bearing and facial expression.*

Results, Interpretations. Since space does not permit us to give *in toto* the results obtained on our subjects, we have selected four words from each of the four categories mentioned above and are giving the response-words and reaction-time to these sixteen words,[2] for all subjects. These results are given in tables I to IV. Table V gives the total and average reaction-time of the respective subjects,

[2] These words were selected on the basis of our judgment that they were typical words in the different categories and not because of any peculiarity in quality of response or reaction-time.

Table I—*Showing response words and reaction time for all subjects to stimulus words judged to be without strong mood-associations.*

Stimulus Word	Sub.	Normal Mood		Elated Mood		Despondent Mood	
		Response	Time	Response	Time	Response	Time
	1	Times	1.8	write	2.0	write	2.0
	2	read	1.4	white	1.6	cry	2.0
	3	read	2.4	read	2.4	read	2.4
Paper	4	write	1.2	write	1.4	torn	2.0
	5	white	1.6	white	2.0	accident	2.4
	6	write	1.2	write	1.4	write	1.4
	7	white	1.4	weight	1.6	black	1.8
	1	head	2.0	floor	2.2	floor	2.6
	2	forest	1.6	chop	1.4	fall	2.4
	3	box	2.2	tree	2.0	desk	3.8
Wood	4	pencil	2.0	yes	1.2	stove	2.0
	5	hard	2.2	trees	1.4	brown	2.4
	6	stove	2.0	stove	1.4	stove	1.6
	7	coffin	1.6	dead	2.2	coffin	2.0
	1	foot	1.4	hat	2.6	foot	3.0
	2	wear	1.8	wear	1.4	heavy	1.8
	3	foot	1.8	foot	2.8	foot	4.0
Shoe	4	foot	1.4	foot	1.4	torn	2.0
	5	foot	1.2	lace	1.2	foot	1.8
	6	stocking	1.4	wear	1.8	toe	1.4
	7	boot	1.0	boot	1.6	none	3.8
	1	white	1.2	white	2.0	dead	3.2
	2	white	1.4	cover	1.2	heavy	2.2
	3	soft	2.2	soft	1.8	snow	1.8
Snow	4	white	1.6	pure	1.4	black	1.8
	5	light	1.4	sled	1.8	cold	2.4
	6	white	1.4	white	1.6	white	1.2
	7	white	0.8	white	2.0	blue	3.0
Average Reaction Time			1.67		1.74		2.29

in the different moods, for the complete list of words; and also the totals and averages of all the subjects considered as a group.

A moment's study of Tables I to IV reveals a fairly consistent difference in reaction time for the different moods, irrespective of the particular type of words considered. Thus the average reaction time in the despondent mood of all the subjects for the sixteen selected words is 167 per cent of the reaction time in the normal mood. And as shown by Table V, there is a marked difference in the reaction time between the normal and despondent moods in all the subjects,[3] and a less marked difference of like order between the

[3] With the exception of Subject 6 whom the writers regard as a predementia praecox type of person. Although she had complete post-hypnotic amnesia, as far as we could learn, she never showed the least discernible mood variation. It will

Table II—*Showing response words and reaction time for all subjects to stimulus words usually associated with pleasant moods.*

Stimulus Word	Sub.	Normal Mood		Elated Mood		Despondent Mood	
		Response	Time	Response	Time	Response	Time
Birds	1	sing	1.6	pretty	2.6	dead	3.6
	2	fly	1.6	sing	1.8	die	2.2
	3	feathers	1.8	sing	2.0	sing	2.4
	4	whistle	1.4	life	1.6	dead	2.2
	5	song	1.6	singing	1.4	tree	3.0
	6	trees	1.8	trees	1.4	trees	1.6
	7	sing	1.2	trees	1.8	dead	2.2
Life	1	happy	2.4	joy	2.0	death	2.2
	2	life	1.6	laugh	1.6	death	2.2
	3	live	3.4	life	3.6	light	3.6
	4	death	1.4	life	1.4	death	1.6
	5	movement	2.2	joyous	1.4	black	4.2
	6	death	1.4	death	1.6	death	1.8
	7	death	1.4	death	2.4	ashes	2.8
Music	1	sheet	3.2	dance	2.0	sheet	2.6
	2	sound	1.8	play	2.0	sad	3.2
	3	sound	1.8	vibrant	4.8	sound	3.0
	4	song	1.4	life	1.4	sour	2.8
	5	Beethoven	1.8	soul	1.4	song	4.6
	6	noise	1.6	death	1.6	dance	1.2
	7	dance	1.4	happiness	1.8	sad	2.0
Happy	1	sad	1.6	joy	2.0	sad	2.4
	2	gay	2.0	gay	1.2	sad	2.8
	3	sad	1.4	happy	2.8	sad	3.0
	4	love	1.2	exuberant	1.4	despondent	1.6
	5	laugh	1.8	gay	1.4	sad	1.8
	6	gay	1.4	gay	1.6	gay	1.4
	7	death	1.4	glad	2.4	sad	2.0
Average Reaction Time			1.70		1.94		2.50

normal and elated moods in four of the seven subjects. We also notice an appreciable difference in reaction time, when the averages are considered, for the different types of words: words without strong mood associations giving the shortest reaction time, words with pleasant mood associations coming next, words with unpredictable mood associations third, and words with unpleasant mood associations giving the longest reaction time.

With respect to the qualitative aspect of the responses in the different moods, evaluation is very difficult. Certain variations in the type of reaction are too striking, however, to be without significance.

be noticed that the qualitative as well as the quantitative aspect of her responses was surprisingly constant.

Table III—*Showing response words and reaction time for all subjects to stimulus words with unpredictable mood-associations.*

Stimulus Word	Sub.	Normal Mood		Elated Mood		Despondent Mood	
		Response	Time	Response	Time	Response	Time
	1	man	1.8	man	2.0	hate	3.0
	2	hurt	2.0	sex	1.0	hurt	2.6
	3	life	2.2	life	2.6	open	8.0
Sex	4	woman	1.6	love	1.4	no	4.8
	5	age	3.0	food	3.2	people	12.4
	6	woman	1.8	man	1.6	man	1.6
	7	love	1.0	love	2.6	death	3.2
	1	hate	1.4	hate	2.8	hate	1.4
	2	hate	2.0	love	2.8	hate	2.8
	3	life	2.0	man	3.2	love	10.4
Love	4	girl	2.0	yes	1.2	hate	1.8
	5	man	2.8	desire	2.8	hate	2.4
	6	hate	1.6	hate	1.4	hate	1.6
	7	happy	1.2	happiness	2.2	death	3.6
	1	work	2.0	books	2.4	"D"	3.0
	2	write	2.0	house	1.8	go	3.2
	3	study	1.8	study	2.0	study	3.0
School	4	learn	2.0	joy	1.4	putrid	3.2
	5	read	1.8	subway	1.8	books	2.0
	6	work	1.4	work	1.2	work	1.4
	7	boy	1.6	boy	3.0	coffin	2.2
	1	mother	1.6	mother	2.0	death	3.0
	2	father	1.8	folks	2.2	hurt	3.6
	3	father	1.4	father	1.6	one	3.8
Parent	4	father	1.2	love	1.6	sorrow	1.6
	5	mother	1.4	mother	1.4	mother	2.4
	6	father	2.0	father	1.4	father	1.8
	7	father	1.4	father	1.8	dead	3.2
Average Reaction Time			1.77		2.01		3.46

Table VI gives the number of times certain response words occurred in the different moods.

Now assuming that further work along this line of investigation is going to tend to substantiate the results of the present study, we are confronted with two questions: Why does the qualitative aspect of the response tend to change with the mood, conforming, as it would seem, more or less to the nature of the mood and, secondly, why the quantitative change? With respect to the first question we can only agree with the casual observations of daily life that a despondent mood lowers the threshold to despondent thoughts, an elated mood to elated thoughts. With respect to the second question, a number of possible explanations come to mind.

Table IV—*Showing response words and reaction times for all subjects to stimulus words usually associated with unpleasant moods.*

Stimulus Word	Sub.	Normal Mood		Elated Mood		Despondent Mood	
		Response	Time	Response	Time	Response	Time
	1	tears	1.8	happiness	2.8	weep	3.0
	2	hurt	1.6	sad	1.6	sad	3.8
	3	happiness	3.0	joy	2.4	sadness	7.8
Sorrow	4	joy	1.6	joy	1.6	despondent	2.0
	5	despond	3.8	happy	1.4	troubled	4.2
	6	sad	1.4	happy	1.6	happy	1.6
	7	gladness	1.4	happy	2.8	death	2.6
	1	afraid	1.6	unafraid	3.4	hate	2.0
	2	hurt	3.0	laugh	2.0	hurt	3.0
	3	fright	1.8	no	4.8	hold	13.8
Fear	4	hate	2.0	love	1.2	afraid	2.6
	5	trouble	4.2	distrust	1.6	trouble	4.4
	6	afraid	1.8	hate	1.6	anger	1.4
	7	hate	1.4	sunshine	3.2	yes	2.8
	1	fall	1.6	happen	4.8	auto	3.0
	2	hurt	1.8	play	1.8	die	2.8
	3	pain	1.6	auto	2.0	auto	2.6
Accident	4	car	1.4	car	1.4	death	2.2
	5	hurt	1.6	hurt	1.6	death	2.8
	6	happen	1.8	happen	1.6	wrong	1.8
	7	death	1.2	sad	2.0	sad	3.2
	1	love	2.0	love	1.8	sad	3.0
	2	hate	3.0	hate	1.8	hate	2.4
	3	love	1.8	mother	2.6	mother	3.0
Hate	4	love	1.8	love	1.6	hate	2.0
	5	like	1.8	want	2.2	person	13.4
	6	fear	1.6	love	1.6	love	1.4
	7	death	1.2	laughter	2.4	death	2.8
Average Reaction Time			1.95		2.18		3.62

(1) It may be held that a mood is a general response, "postural" or of the nature of a "mental set," and that it therefore acts as a selective factor which tends to inhibit or block all ideational responses except those belonging to a certain category; and that this selective and inhibitory function tends to lengthen the reaction time. (2) It may be argued, following Janet, that a mood is a matter of mental depression, a relative lack of psychic energy, and that due to this insufficiency of psychic energy or "push," intellective reactions tend to be retarded. (3) Somewhat in line with Jung's psychology, we might reason that a mood, whatever else, is an "introversion of the libido," in other words, a tendency on the part of the individual to engage himself with the matter of how he feels, and that this

Table V—*Average reaction time of the different subjects for the complete list of words and the averages of the group as a whole.*

	Normal mood reaction time	Elated mood reaction time	Despondent mood reaction time
Subject 1	1.55	2.03	2.62
Subject 2	1.64	1.45	2.26
Subject 3	1.75	2.35	3.25
Subject 4	1.19	1.34	1.81
Subject 5	1.75	1.63	2.77
Subject 6	1.23	1.23	1.48
Subject 7	1.01	1.90	2.34
Group Average	1.45	1.70	2.36

Table VI—*Showing frequency of certain words for different moods.*

Response word	Frequency in normal mood	Frequency in elated mood	Frequency in despondent mood
Sad	4	3	13
Hate	5	7	14
Death	5	3	21
Dead	0	1	11
Joy	2	4	0
Happy	6	5	1
Love	12	9	2
Life	11	7	1

self-preoccupation interferes with his responding to events in the external environment. (4) Finally, we might contend that a mood amounts to an accumulation of energy ready for discharge, that it is a preparedness for action, lacking, however, direction or orientation; and that therefore every thought tends to be "held up" for examination, very much as when one is trying to decide among several different alternative modes of action.

As to a choice among these various suggested explanations, the writers have very little inclination to commit themselves. We believe that until considerable experimental work is done on the problem of moods, and results fairly substantiated, interpretations and explanations are somewhat premature.

DEVELOPMENT OF THE PICTORIAL APTITUDE IN CHILDREN

ERNEST SEEMAN
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As Nature is accustomed to perform her various miracles of integration and disintegration through rhythms, or particular patterns of vibratory stress and motion-flow, it is not surprising that my humble experiments in the field of how-children-learn-to-draw indicate that the unfolding of the pictorial aptitude as a skill follows this same fundamental law which motivates the birth of a planet, the disruption of an atom, or the opening of a rose. And though heredity apparently determines the basic quality, richness, and tempo of the individual's art instincts, I shall undertake to demonstrate in the pages following that the general psychic process by which the child develops its pictorial genius as a skill—whether such child be native to a Mongolian metropolis or an American factory town—is universally the same.[1]

Even among primitive peoples whose ideas and customs have for millenniums been evolving in directions different from our own, and whose culture has, through isolation, remained strongly conventionalized and free from alien influence, investigation reveals that children learn to draw by much the same steps as those of the more sophisticated races. That is, proficiency in drawing appears to emerge through a series of trial-and-error experimentings very similar in kind, whether the child be little or greatly gifted and irrespective of racial or economic backgrounds. The prodigy, because of superior intuitional faculties, keener observation, and richer idea-flow, may conquer certain of these learning experiences at a bound, or even skip parts of the process altogether, but his advance will nonetheless follow the same general route of unfoldment as that of his fellows, a route in which certain steps seem to be as fundamental

[1] See Table I for a statistical comparison of the drawing-development of one hundred young children in Shanghai and Soochow, China, with those of one hundred in Durham, North Carolina.

as those employed in the struggle of learning to walk, to talk, or to acquire other common coördinations and skills.

As children vary in degree of innate artistic genius, the development of individual aptitude resembles a kinetoscopic film run at varying speeds: the sequence of activity is the same, although the tempo differs. The slow-motion presentation typifies the learning performance of a child of no marked genius, the average-speed presentation that of the averagely-gifted child and the rapid presentation that of the prodigy.

In addition, however, to the part played by the rich or meager inheritance that distinguishes the extremely-gifted and the dull child —enabling the one to grasp at a flash learning processes that for the other require long and plodding application—a rich environment in early childhood undoubtedly stimulates unfoldment of the graphic abilities. By "rich environment," I mean a surrounding social milieu in which there is not only continuous opportunity for artistic expression, but in which all other aptitudes are encouraged to find outlet and the personality is enriched by fullness of general experiment and experience.

That the strength of inheritance will bestow upon the art products of the "gifted" child certain unique qualities derived from the depths of his more perfectly coördinated personal or psychic make-up is undeniable; and it is quite the usual thing to find the prodigy strongly bent to a certain recognizable style, as well as virility, of expression from very early years. In fact, I have but to recall the name of any markedly precocious artist to recall also a metier of expression remarkable for its differentness. Romano Dazzi's drawings were, from his infancy, distinguished by a passion for portraying animals; Watari Shigehiko's expression runs almost exclusively to scenes centered around machinery; by her fifth year, Lesley McDougall's drawings reflected a marked personal flair for graceful movement, a metrical aptitude which led her also to become an extraordinary dancer; Charles Lambeth, almost from his earliest recognizable sketching of objects, was obsessed with the desire to portray masses of men and animals in violent motion; and Pamela Bianco's pen-and-inks were, before age six, imbued with such a remarkable delicacy of fantasy as to give them the quality of fairy embroidery—and by age twelve her expression had developed in such distinctive strides that she was producing art "as fine, in essence, as that of Botticelli, Piero

della Francesca, Giotto."[1a] To the genesis of pictorial aptitude racial inheritance, too, seems to contribute, and we encounter a strikingly higher percentage of art prodigies among some peoples than others.[2]

At this point, let us trace briefly some of the principal steps by which the young child learns to handle a drawing implement,[3] and by its use, to express his artistic feelings.

Beginning with Figure 1, we will examine an attempt of an eighteen-months-old child to use a pencil. Although by early adolescence this infant subsequently became an artist of considerable ability, this, one of his first essays in art, was a mere forcible attack on the paper with the pencil; so that random dots and dashes are the only pictorial result. Note that the dashes, or weak lines, were pro-

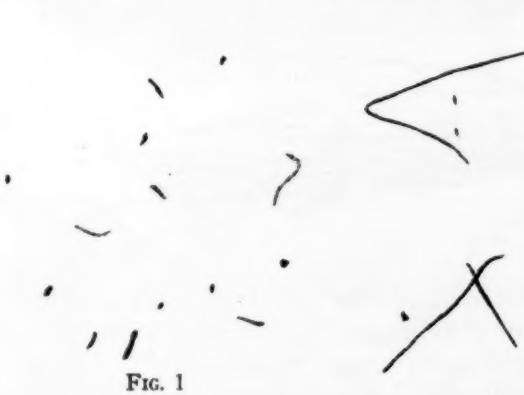


FIG. 1

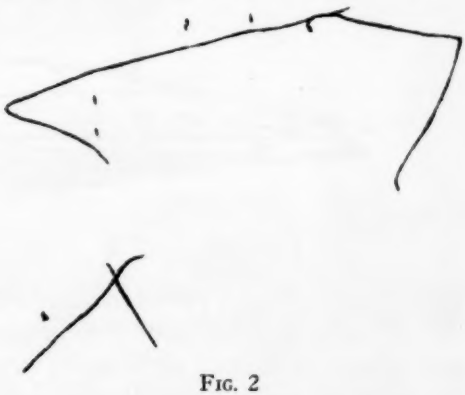


FIG. 2

duced at first accidentally, through the skidding of the pencil rather than by design. The mode and effectiveness of the first contactings of pencil and paper vary widely, being influenced not only by physical circumstances motivating or handicapping the effort but by such innate personality traits as initiative, timidity, concentration, inventiveness, deliberation, or the like.

At Figure 2, the child's fortuitous and clumsy discovery of line-technique has developed (simultaneously with his rapidly increasing

[1a] From "The Drawings of Pamela Bianco," by J. B. Munson, in *The International Studio*, July, 1919.

[2] In my own experience, particularly Mexican-Indians, Japanese, Italians, and Czechs.

[3] When the child is denied any intermediate tool, such as the pencil, and is encouraged to employ the inartificial medium of its own fingers and hands dipped in liquid mud or other pigment, its techniques evolve somewhat more rapidly. A study of skill-acquirement through this primitive means is now being conducted by the author and Ruth Faison Shaw, a pioneer in the mud-paint method.

motor coördination) in strength and control; and experimenting from the simple line, he has evolved angles and "x's."

Figure 3A shows a two-year-old primitive child's[4] first achievement of a "lateral whirl," a technique evolved from a rapid movement of the hand from left to right. Figure 3B shows the same technique

FIG. 3A

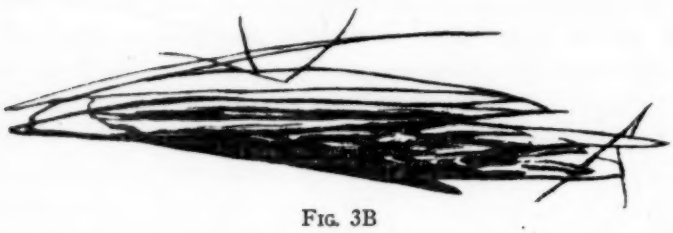


FIG. 3B

as first achieved by a privileged American girl at age 1-7,[5] and Figure 3C the same by a Japanese child of age 1-3. A groping for form is also evident in each of these early "whirl" experiments.[6]

With the beginning of the whirling techniques, we have visible manifestation of that underlying rhythm of pictographic develop-

FIG. 3C

ment to which reference has already been made; and it may now be instructive to scrutinize more closely the broad significance and

[4] Dr. Margaret Mead, who collected this specimen, furnishes the following ethnological note: "It was drawn by the girl Nemoisi, age 2, of the village of Alitoa, Arapesh Tribe, Wiwiak Sub-District, Mandated Territory of New Guinea. These are a group of mountain people, speaking a non-Melanesian language."

[5] One year and seven months.

[6] The expression of form may be said to date from the time a line doubles back to meet itself—thus recording the idea of thickness, or shape.

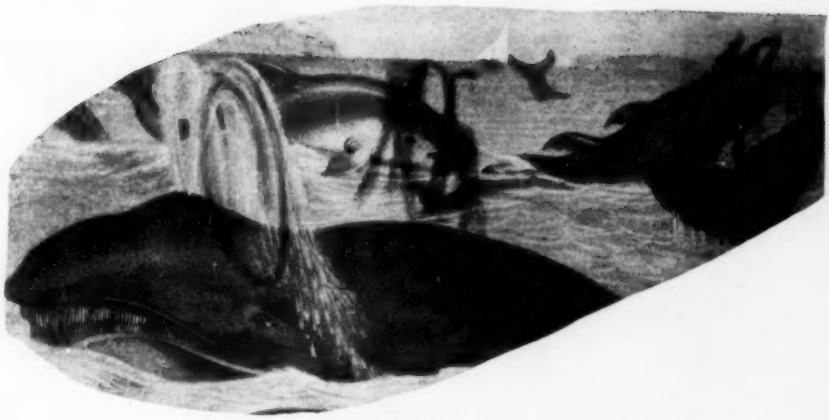


FIG. 4

FIG. 5C
'The Man with the Fish-stick'—a finger-painting by a boy at age 4½.

practical operation of such rhythmic convolutions in the integration of drawing skill.

In Figures 3, our young artists—New Guinean, American, and Japanese—have, though widely separated geographically, ethnologically and culturally, unconsciously employed a form of drawing-expression common to beginners the world over. And that such rudimentary technique is also ages old, is suggested frequently in the drawings of extinct peoples.

Now, these cramped but copious outpourings of line—which, it may be observed, all emerge from an elliptical trajectory of the hand and comprise a series of embryonic or collapsed circles—constitute the rhythmic scaffolding, so to speak, on which drawing-skill builds; and this particular motion-flow, as we shall see, is no less peculiar and necessary to the launching of pictorial aptitude than is the lunar rhythm to the launching of the tides or the menstrual rhythm to the transporting, conditioning, and protection of ova in the biological genetic processes.

To further trace the function of this circular-tending rhythm, let us now examine Figure 5A. In this drawing by an American Negro child of age 3-9, the lateral-whirl stage has been passed and the

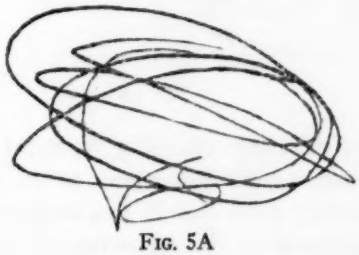


FIG. 5A

rhythm has emerged in freer and more expansive form. That is, through practice of the earlier constricted elliptical motion, the embryo circles are evolving into true circles and the child has automatically acquired the technique of the true whirl. The same evolution is to be seen in Figure 5B, a drawing by a Russian girl of age 3-6; and in the finger-painting of Figure 5C a French child has caught the constructive significance of this rhythmic emergence and cleverly utilized it as decorative background.

The general constructive tendency of the rhythm, however, following the ripening of the whirl-technique, is toward simplification. Having reached its climax of verbosity, or profusion of line-flow, a

recession sets in, and although its dominant form and direction remain, a preponderance of the meaningless lines is sloughed off in favor of a few that are ideative, and therefore illustrative. This emergence of pictorial skill is well exemplified in Figure 4 (the early attempt of an American child to imitate a printed picture by lines drawn upon the model). Here circles and ellipses—crude, but with pictorial significance—have emerged as the definite corolla of the

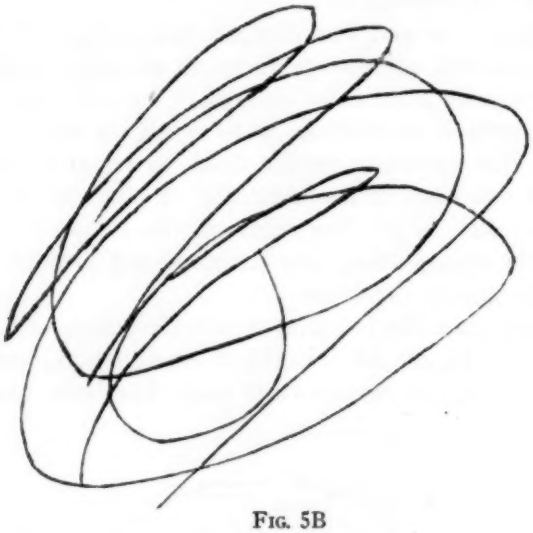


FIG. 5B

former profusion of nebulous whirling material. Such elimination of the superfluous here is quite analogous to the withdrawal of scaffolding from a masonry arch that it has supported during integration; or to the withdrawal of the menstrual rhythm with the beginning of ovular development *in utero*.

With this coming forth from envelopment of ellipses, "angular circles" (triangular forms as at Figures 6A, 6B, and 6D) and true circles, the child discovers the resemblance of such geometrical fig-

FIG. 6A 6B 6C 6D

ures to the human face; and as the faces of beloved or detested persons in his environment are perhaps the most impressive focal points of observation at this stage, he—at first largely by accident, no doubt, and then by design—begins to associate and depict the features of eyes, nose, mouth and, finally ears, within the circular form (see Fig. 6A, by a privileged and precocious American girl of age 3-6; Fig. 6B, by an underprivileged American boy of 5; 6C, by a privileged boy of 4-6, China; and Fig. 6D, by an underprivileged boy of 7, India).

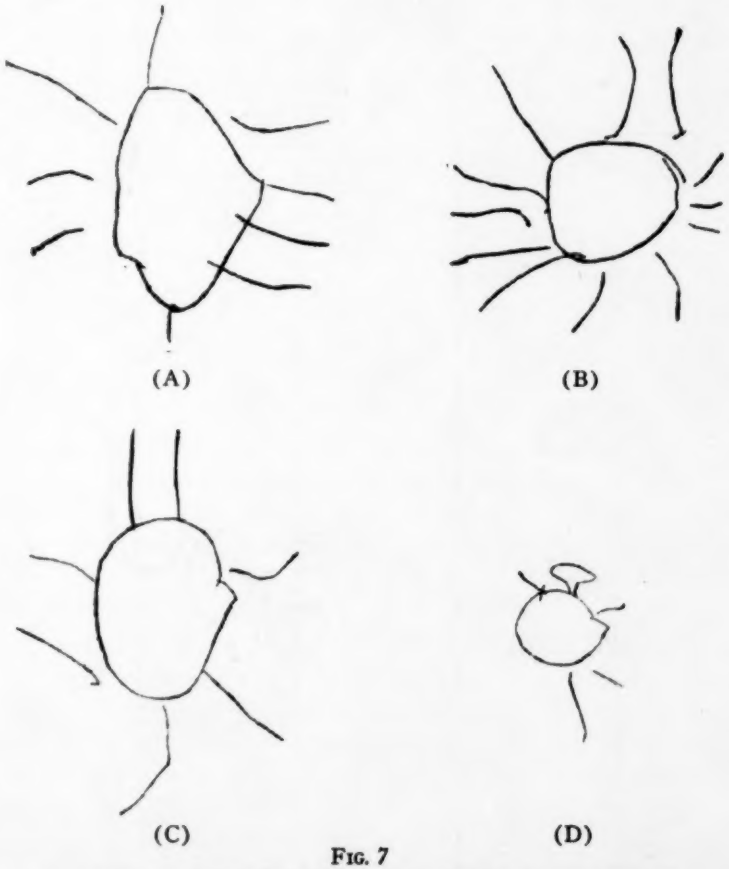


FIG. 7

EVOLUTION OF THE STICK-MAN (BY PRIVILEGED AMERICAN BOY)

(A) Torso well defined, neck indicated but limb expression verbose.
(B) Conception of neck and legs progressing, but arm expression verbose. Note whirling tendency of all lines.
(C) Simplification complete, except for arms.
(D) Perfected man, including head.

Here begins the important cycle of the child's struggle to express the form of the human ego. This long-drawn-out effort—which seems to be motivated by some powerful urge that, under favorable circumstances, most commonly becomes active between the approximate ages of two-and-a-half and four—brings forth crude depictions of facial features, or attempts at drawing the body (see Fig. 7), or both may be attempted simultaneously.

At first the child is baffled by the complexity of man's parts, and an incongruous lack of coördinated observation is evident in the placing of arms (see Figure 7½) and legs and in the number of

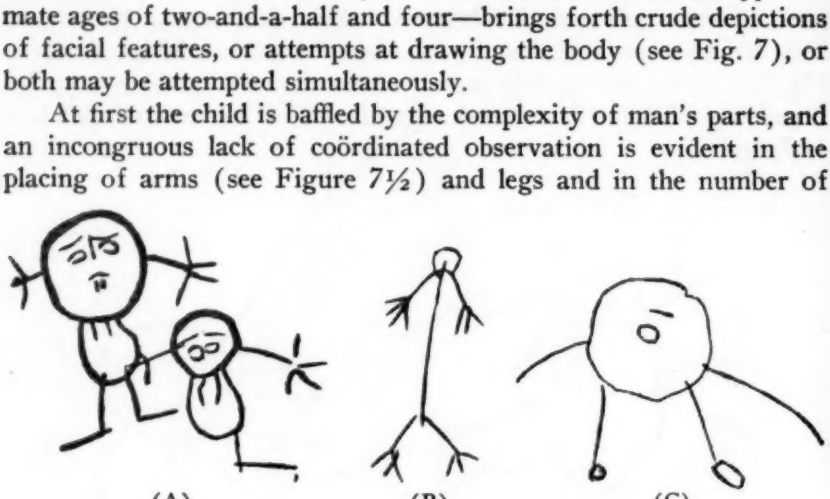


FIG. 7½
ARMS ATTACHED TO HEAD
(A) Chinese (B) Primitive New Guinean (C) American

fingers and limbs depicted.[7] The evolution of the stick-man to the point where these discrepancies disappear, requires, even with the average privileged child, no less than a full year; and this liberation is perhaps most commonly experienced by such children between the ages of four and five.

At this point in the unfolding of pictorial aptitude, temporary recessions in the learning process are not uncommon. For instance, a child may by pure accident, or in a temporary burst of creative energy, depict at a very early age a fairly perfect face, or a complete "stick-man," but be unable to repeat his brilliant performance. His reach has exceeded his grasp, as the poet would say, and his integrating, but not yet fixed, skill lapses back to mediocrity for weeks or months; and not until sufficient coördination has been developed in the general motor and intellectual departments of his personality can he repeat the feat at will.

[7] In the psychopathic adolescent or adult, such underdevelopment in pictorial skill is classic; incongruities such as limbs joined to the body at the ears being typical in the drawings of mentally retarded subjects.

Before the stick-man is completely achieved, similar rudimentary depictions of animals will also usually have been attempted, and in such experiments there occur, likewise, retrogressions from advances that his general undevelopment will not permit him to maintain.

The "enfolded technique" shown at Figs. 8A and 8B is a not-uncommon phenomenon at this stage of learning. In these illustrations, two children of different nationalities, living several thousand miles apart and separated by a generation of difference in age, have been baffled at the same hurdle and have reacted in the same way. In Fig. 8A, the skill of Duncan M. (a British boy of age 3-1) has

FIG. 8A

been inadequate for the depiction of a human head and torso *in sequentia,* and so he has superimposed one upon the other. In Fig. 8B William S. (an American boy of age 3-11) has met the same dilemma with the same artifice in portraying a bear.

As the complex artistic experience of the stick-man is lived through, however, its mysteries clear up, and facility achieved in its important and broadening techniques, such an increased coördination of physical and mental powers will usually have taken place as to bring the child an unprecedented release of creative orgasm and

skill. Thus, between its fifth and sixth years the average privileged child (i.e., a child of normal intelligence living in a stimulative environment) will, as a rule, have advanced sufficiently in adroitness to depict almost any simple object in a crude but recognizable way; as well as abstract fancies and recollections of the past.

FIG. 8B

In the drawing-expression of the sexes a few subtle differences appear; but as this variation seems to be largely a by-product of developing heterosexuality—with a differentiation of interests—its analysis is omitted from this study of the primary techniques of young children.

It is in the highly formative stick-man period that symbolic details peculiar to certain racial cultures most commonly begin to superimpose themselves on individual technique. Even these specialized

conventions seem also to owe their origin, for the most part, to universal and perhaps very ancient forms of free expression. For instance, the children of certain Melanesian tribes habitually portray the apex of the human head as a flat, or truncated, surface (perhaps from the fact of primitive man thinking of the head as a place for carrying loads). But that this expression is not a monopoly of Melanesian, or even of primitive, culture is certain, since the phenomenon occurs sporadically in child-drawings from all parts of the world. The youth of India also customarily depict the fingers dependent at right angles from the line of the arm (see Fig. 9A); but this expression also occurs in scattered instances in the drawings of children of other races and climes (see Fig. 9B, 9C).

FIG. 9A (India) 9B (United States) 9C (China)

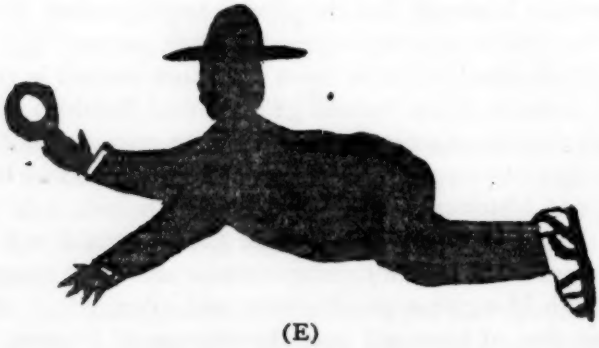
It is certain, however, that the psychic impingements of racial culture bias the child's pictorial expression from an early age. As universal and individual genius is more and more steeped in the specialized environments of the various geographical divisions of mankind —in which there have arisen profound differences of ideal, tradition, and even physique—art expression is necessarily colored by the ethnological and historical background through which it is nourished (see Fig 10). Thus the Japanese or Chinese child will naturally clothe his stick-man in nationalistic costume and quite subconsciously endow it with Mongolian physiognomy and expression. The Negro child's depiction of man will bear the impress of his own evolution in its Negroid features. And in the Hindu or the Mexican child's

(A)

(B)

(C)

(D)



(E)

FIG. 10

(A) Japan (B) China (C) India (D) American Negro (E) Mexico

pictorial products there will reflect, no less subtly and surely, characteristics of the human scene to which he is most closely bound by blood and circumstance.

Table I—*Comparison of the drawing-development of 100 Chinese and 100 American children.**

	Chinese								American							
	18 Months	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	Total	18 Months	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	Total
The group by ages	15	14	14	14	15	14	14	100	15	14	14	14	15	14	14	100
Number rated as precocious	....	....	**1	....	....	†2	....	3	....	....	‡2	....	....	....	....	2
Rated as subnormal	....	....	....	....	....	....	1	1	....	....	....	....	....	1	1	2
Number in pre-whirl and whirl stages	15	14	4	....	....	....	....	33	15	14	7	1	....	1	1	39
In simplification-of-whirl stage	....	....	6	3	2	2	1	14	....	....	5	5	1	2	....	13
In stick-man stages	....	....	3	8	5	1	2	19	....	....	2	7	8	2	1	20
Beyond stick-man stages	....	....	1	3	8	11	11	34	....	....	....	1	6	9	12	28

*Based on collections made by Y. T. Chang, Mary Allison and M. Lougee.

**A boy of low economic environment (coolie family) with technique superior to other 3-and 4-year children.

†A girl of moderately high environment displaying unusual powers of observation and analysis, and a girl of impoverished environment displaying unusual feeling for color-combination.

‡An underprivileged boy, son of a mechanic, with a marked bias and fluency for depicting electrical apparatus; and a privileged girl, from cultured and well-to-do family, displaying unusual imaginative concept.

CHARLES DICKENS: A BIOLOGICAL STUDY OF HIS PERSONALITY

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It will probably be acknowledged by all that the great Victorian novelist, Charles Dickens, had an outstanding personality. Biologically, personality is the sum total of the physical, mental, and moral characteristics of any individual. Although the significance of the term personality seems generally recognized, there is little general understanding as yet of the mechanism whereby personality is developed. Among the important factors in the production of personality in man are the products of certain small glands in his body, namely, internal secretions or endocrines, which regulate not only his physical conformation such as stature or hair, but also his mental characteristics such as energy, accuracy of judgment, good or bad temper. Moral qualities such as justice and honesty of purpose, while in part dependent on mental characters, are also in part dependent on these internal secretions. Physical, mental, and moral qualities are connected by the normal quantity, excess, or deficiency of one or more of these secretions, conditions which may be inherited. Also, the products of the body glands interact one with another, and defects in one may be compensated by increased activities of others. The gland products are chemical messengers made in certain glands and carried by the blood to where they are needed. The chief glands connected with personality are the thyroid at the sides of the neck, the adrenals above the kidneys, the pituitary at the base of the brain, the tiny parathyroids near or sometimes embedded in the thyroid, the thymus near the heart, and the sex glands.

In order to understand Charles Dickens' personality and its glandular make-up, it is necessary to consider his physical characteristics, his activities, and the outstanding features of his life (1812-1870), as seen by his contemporaries and biographers. These particulars can be obtained from study of his letters and books, of por-

traits of him, and of accounts of his life by his critics and friends,* especially the full account given by his intimate and very old friend, John Forster, who was also one of his executors.

Physical and Social Characteristics. Charles Dickens as a boy was small for his age and sickly, being the victim of attacks of spasms. This ill health of his childhood will be discussed later in connection with the parathyroid glands. He was not an active participant in boyish games but watched other boys play. His weak health gave him an inclination for reading, which, inculcated by his mother, became a passion with him. He was a sensitive, thoughtful child, with unusual knowledge and imagination. As a small boy, he could tell stories and sing comic songs, accomplishments much appreciated by his father who at that time thought him a prodigy. Forced into uncongenial work at a blacking factory when ten years old, he felt his position acutely, for he was very sensitive and disliked much of the companionship there; he also felt the lack of companions of his own age. In addition, he was very ambitious, with determination, despite his miserable circumstances, to *do* something and to force his way upwards. In this, as will be shown later, he was aided by his thyroid which gave energy and by his adrenals which supplied the necessary driving power. Freed from the blacking factory at the age of twelve, he first went to a school and then worked in a lawyer's office. At the age of fifteen, he was described as a bright, clever-looking youth. He next became a reporter. His health had much improved.

In his early adult years, Charles Dickens was described as having delicate, handsome features, with an oval face, a fine brow, keen vivacious, beautiful eyes, abundant brown hair, and a large, sensitive mouth—a face indicative of one with a well-developed thyroid gland. He had an easy manner and was very particular about his personal appearance, with a tendency to be overdressed. At this time he was very fond of riding and also enjoyed long walks as a recreation from his writing. This habit of long walks, ranging up to fifteen miles and often taken at night, overtaxed his strength in later life. Other occupations in which he took a very active part were private theatricals and play producing.

As a man he was of medium build, with a wiry frame indicative

* John Forster, *The Life of Charles Dickens,* 1872-74. 3 vols.; G. K. Chesterton, *Charles Dickens,* 1906, 3rd edition; E. Pugh, *The Charles Dickens Originals,* 1913; W. Dexter, *Dickens, the Story of the Life of the World's Favorite Author,* 1927.

of great energy. He was of active habits, though not really robust. He was genial, vivacious, and had exuberant spirits. He had great powers of observation, was very resourceful, showed great fertility in creating comic or humorous types, and had great command of the pathetic. From these latter characteristics his postpituitary gland was evidently well developed. Often when at work, he had a craving for crowds and for the streets. When leisure succeeded work, he craved for nature, which he loved in all her forms, especially dogs and birds. So far as his literary labors were concerned, he was most methodical, working regularly from breakfast to lunch time and dealing with his work with precision and dispatch. His love of order was seen in all he did. Whatever he attempted, he did thoroughly and with zest; indifference was repugnant to him. His childish sufferings made an indelible impression on him and inspired him to demand numerous reforms in his books, whereby he became one of the greatest reformers of his time. In this characteristic he was fortunate in being able to draw on his well-developed adrenals. He fought for the ideal of a world where goodness triumphed over evil. He was free from literary jealousy and had due regard for others. Having himself an intense craving for sympathy, he was kindly and sympathetic to others and spent much time in writing letters to his friends. Unfortunately, his home life as time went on was not happy; there was a clash of temperaments between his wife and himself, perhaps due to glandular changes on both sides, as will be shown later. At about the age of forty, restlessness began to be marked in him, perhaps due partly to his unhappy family life; yet he was not fitted for living alone, but needed the sympathy and companionship of others. This may have led to his desire to give public readings as an outlet for his restlessness. He finally separated from his wife by consent when about forty-five years of age. The strain of overwork, due to his readings, much correspondence, writing, and long walks became obvious. He had taken up so much with great zest and had spread himself over too many fields—theatrical, social, philanthropic as well as literary, including editorial, that he gave himself no rest. In his readings he spent too much energy although they were not worthy of his powers, while the travelling involved in connection with them still further drained his vitality; nevertheless he showed perfect self-possession at these readings and other meetings that he attended. A bad railway accident in which he was involved five years before his death was a great shock to his nerves. Continuous

overwork acting on a not too robust constitution largely wore out his adrenals, strained his thyroid, and aided in his collapse and death in 1870 at the relatively early age of fifty-eight.

The Endocrine Glands of Charles Dickens. I have studied and analyzed the glandular make-up of Charles Dickens from the sources mentioned earlier—works, portraits, and accounts by his friends and critics. *It must always be borne in mind that the glands of internal secretion interact one with another and with the nervous system,* and that, in consequence, some overlapping is inevitable in the presentation of any reconstruction of an individual's glandular constitution.

The Parathyroid Glands. The tiny parathyroid glands are concerned in regulating the nervous responsiveness (or irritability, as it is scientifically termed) of organs such as the heart and stomach. Hyperexcitability of such organs constitutes the visceral neuroses, such as gastric neuroses. In such cases, the parathyroid glands are insufficient and cannot supply enough calcium ions to the organs and tissues. The sickliness and spasms of Charles Dickens' childhood were probably due to inefficient functioning of his parathyroids. Also, the baby with inefficient parathyroids is typically small, is a nervous baby, and often forms the hypersensitive adult. As mentioned earlier, Charles Dickens was a small, sensitive, thoughtful child. However, other glands were reacting and compensating in certain fields, so that he had much ambition, despite uncongenial work and poor surroundings. The chief glands that aided him were the thyroid and adrenals which acted together especially after childhood, and compensated in part for his deficient parathyroids. With puberty, the poorly functioning parathyroids became of somewhat less importance.

As an adult, his defective parathyroids and overstrained thyroid and adrenals aided in producing the restlessness and incapacity for rest in early middle age, which may have had something to do with the tragedy of the separation from his wife by mutual consent. This is discussed in a later section of the paper.

The Thyroid Gland. Charles Dickens for much of his life may be considered especially as the product of an exceptionally vigorous thyroid and very active adrenal secretions. The face of a person with hyperthyroid secretion is more or less oval in shape, with delicate features, wide, high brows, large, vivacious, prominent eyes and sensitive lips. It is the least animal of all facial types. This fits well with the portraits of Dickens, which reveal his fine forehead, firm

nose, bright vivacious eyes, and his expression of keenness and openness. His long, thin hands and delicate, tapering fingers are also characteristic of the hyperthyroid. The energy and sensitivity of a person are largely determined by his thyroid. People with dominant thyroid constitutions talk fluently and easily, with animation, as Dickens did. They are sensitive and acute in their perceptions and have relatively good memories. Essentially they are the great doers of things, not mere onlookers. Dickens was well known for his enormous output of original work—his books, his plays, his intensely human and interesting readings. He had acute powers of observation and regard for detail that were remarkable. He travelled, wrote, and lectured and did all well. He was most enthusiastic. His great devotion to social service is well recognized, and his books dealing with various aspects of social reform or reorganization so aroused the public that the desired ameliorations or improvements came about, sometimes with great rapidity. Thus, he pilloried the abuses of Chancery that allowed of great delay and injustice, the administrative incompetence shown by the "Circumlocution Office" and the "How not to do it" methods, politico-economic shortcomings, and cringing servility in *Bleak House, Little Dorrit, Hard Times,* and *Our Mutual Friend.* Prison abuses and the conditions in debtors' prisons were exposed in the *Pickwick Papers,* parochial mismanagement and the iniquities and horrors of the poor law system and workhouses, the exploitation of young children and the training of them as criminals in *Oliver Twist,* the evils of boarding schools in Yorkshire with their bullying, ill-treatment, and starvation in *Nicholas Nickleby,* the obnoxiousness of make-believe and pretentiousness in *Martin Chuzzlewit* and the *Pickwick Papers,* and the need for proper training of nurses and midwifery reforms as portrayed by Sairey Gamp in *Martin Chuzzlewit.* All these productions and activities showed Dickens as a man dominated largely by an unusually active thyroid gland, aided, as was essential, by very active adrenals, considered in the following section.

The Adrenal Glands. The multitudinous occupations and activities of Dickens needed more than thyroid super-sufficiency, already described, to sustain them, and, fortunately, Dickens' adrenal glands responded and aided him. The adrenal glands are two in number, one above each kidney and each adrenal or suprarenal gland has a double origin and double function. The outer layer or cortex varies in size with the pugnacity and sex of the person concerned and con-

trols sexual development. It is also concerned in brain development. The inner portion or medulla is highly important, for it secretes adrenalin, the great controller of blood pressure, necessary for offence and defence and for sustained effort or work. The physiologist Cannon has built up the theory of the adrenal as a gland of emergency—the reserve store of energy. Great exertion and profound emotion, such as Dickens underwent, result in more adrenalin being supplied to the blood, and pain, anger, or excitement cause its discharge from the glands. It was the presence of an excess of adrenal secretion that gave Dickens the endurance to produce book after book and to put forward in so vigorous a style his wrath and righteous indignation at cruelty, callousness, sordidness, and incompetence. His books, his intense identification of himself with some of his pen characters whilst creating them, his bulky correspondence and numerous vivid letters, his acting, his travels, his habit of taking very long walks, as much as fifteen miles at a time, all drew upon his reserve energy. Also, in his latter years, when his health was indifferent, he had to pay for the undue strain put upon his adrenals by the hardships of his early life. Another factor in the adrenal exhaustion came in his public readings, on which he expended too much energy and driving force, which demanded too much travelling, and which were not worthy of his best powers. To the initial disability due to poor parathyroids and the using up of energy which overworked his thyroid and was manifested as restlessness and nervous irritability, were added occasional periods and moods of deep depression and fatigue, with poor appetite, showing the adrenal fluctuations of one of the most energetic and optimistic of men. Undoubtedly in Dickens the thyroid and adrenal very closely interacted and produced in him his great capacity for work.

The Pituitary Gland. The so-called pituitary gland, like the adrenals, is of double origin and each part has its own secretion which makes its impress on personality in quite different ways. The anterior or prepituitary gland secretion makes for virility and brain power or intellectuality. Love of fame and applause, ambition and display of power may be due to its action. Dickens, on the whole, was an active, virile man, with a buoyant spirit and good brain power, and his prepituitary must have been well up to the average. Excess of postpituitary secretion, on the other hand, may be associated with vivid imagination and effeminate tendencies. In this connection Chesterton writes of Charles Dickens that "there was in

his curious character something that was feminine. Certainly there was nothing more entirely feminine than this, that he worked because he was tired. Fatigue bred in him a false and feverish industry." Dickens' vanity, great attention to his personal appearance, and meticulous neatness were carried to such a degree that he has even been termed foppish and dandified, and these testify also to the activity of his postpituitary gland. His susceptibility, sentimentality, and eager craving for sympathy, his command of the pathetic and unfittedness to live alone also are mental reflexes of his postpituitary condition.

The vigor, energy, persistence, and sympathy of Charles Dickens may be said to be due to good balance between his pituitary, adrenal, and thyroid glands, with the two latter, however, dominating.

The influence on Charles Dickens of other glands of internal secretion, such as the thymus, the gonads, and possibly the pineal, are not easy of estimation from the data available.

The Glandular Inheritance of Charles Dickens. Glandular constitution or make-up is, in part at any rate, inherited. The ancestry of Charles Dickens is worthy of consideration. Unfortunately, the records relative thereto are meagre, and for really adequate evaluation, there should be information about his four grandparents. But information relating to one grandparent only appears to be available and that is significant. Dickens' paternal grandmother was a housekeeper at Crewe and was famous for her power of telling stories—undoubtedly a capacity transmitted to her grandson.

John Dickens, the father of Charles, was much loved by him. He was genial, indulgent and kindhearted, but was also careless and improvident, muddling along, with little idea of providing either for the education or the future of his son. He could hardly be described as a success in the world. He was also magniloquent in speech and was unconsciously selfish. The kindheartedness of Charles Dickens and his great sympathy probably were inherited from the paternal side, as was also some of his nervous selfishness. The pompous diction of the father is reflected in some of the phraseology that came so naturally to his gifted son. The happy-go-lucky characteristic of John Dickens is indicative of excess postpituitary.

The mother of Charles Dickens, born Elizabeth Barrow, was the daughter of a naval lieutenant and was an educated woman who, at one time, opened a school. Unfortunately she had a diffuse mind. In his childhood she taught Charles regularly, not only reading but

English and Latin. Yet she was a vain, inconsequent woman, selfish and frivolous, as portrayed by her son in Mrs. Nickleby. Later, she had little regard for the sensitive nature of the child, when she desired to send him back to the blacking factory that he loathed. From her Charles apparently inherited the postpituitary development that made him over-attentive to his personal appearance. The inheritance of a postpituitary constitution from both parents may have accounted for the craving for sympathy and the vanity of the famous author.

Dickens' Wife and Children. With regard to his wife, born Catherine (Kate) Hogarth, Dickens himself is rather silent. From such accounts as are available, mostly provided by Dickens' letters to friends, it seems that she was an amiable and pleasant woman who, though a good traveller and not nervous, was inclined to give in easily to physical exertion. Dickens himself in 1842 mentions in a letter a "propensity" of hers—"She falls into, or out of, every coach or boat we enter; scrapes the skin off her legs; brings great sores and swellings on her feet; chips large fragments out of her ankle bones; and makes herself blue with bruises." This pen picture is that of a slightly myxoedematous woman, suffering from inadequate thyroid secretion. Efforts of such persons are weak, because their ability to mobilize energy is limited. The portraits of Mrs. Charles Dickens tend to confirm the diagnosis of slight subthyroidism. She may also have become somewhat deficient in postpituitary secretion, due to her repeated pregnancies, for she had ten children. She was susceptible to hypnotism, as Charles proved, and was not inquisitive, even refraining from opening desired letters until his arrival from some social function. Until Charles Dickens was about thirty-two years of age, the couple appear to have got on well together, as is shown by his references to her on their travels together in Italy, other parts of Europe, and the American continent. Thereafter matters became difficult, and the clash of temperaments between them led to separation by mutual consent in 1858. This clash was probably due, on the one hand, to the nervous selfishness of Dickens, who insisted on the immediate gratification of his every whim, and on Catherine Dickens' side to the subthyroid condition, which made her seem somewhat lazy, apt to give in to difficulties, to be more concerned with creature comforts and unable to mobilize the energy to comply immediately with his whims.

As regards Charles Dickens' children, some of his talents were

exhibited by at least one of his sons, Sir Henry Fielding Dickens, a distinguished lawyer. His daughter Mary (Mamie) Dickens wrote *My Father as I Recall Him.*

Dickens as a Eugenist. From a consideration of Charles Dickens' personality, it will be realized that he was a eugenist in the truest sense of the term as defined by its founder, Francis Galton, for there is no doubt that he was a protagonist of those "agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally."

In conclusion, it is hoped that this analytical study of endocrine interactions and reactions on the personality of Charles Dickens may prove of interest and service to students and workers in social biology.

CAN DIFFERENT WRITERS PRODUCE IDENTICAL HANDWRITINGS?

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For many centuries the juridical system in all countries of Western civilization has taken it for granted that no two persons can write an identical hand; and this is the reason why, where there are no witnesses to confirm the authenticity, any disposition of money or property is valid only when confirmed by the disponent's signature.

The bank clerk is supposed to tell at a glance whether a cheque presented to him bears the genuine signature of the client, and would be fully responsible for any mistake. So strong is the belief that we sign our name in a unique way, typical of our personality only and of nobody else's, that a bank clerk, though not particularly trained in this respect, is expected correctly to judge any of thousands of signatures which may pass through his hands in the course of a day.

Whereas now the law is quite satisfied about the genuineness of a document when the signature beneath it is undisputed, so far as the documents of every-day commercial life are concerned, it insists on more solid safeguards when it comes to wills. In many countries a will is regarded as legal only when the genuineness of the signature is confirmed by two witnesses. A will not testified in such a way will be accepted by the legal authorities only if not only the signature, but also the whole of the preceding text, has been written in the testator's own hand. Evidently the law assumes that it is much easier to forge a signature than consistently to write some lengthy text in somebody else's hand.

But that is not the whole story. This differentiation between documents written in the routine of daily life on the one hand, and wills on the other, is due to the fact that wills are often signed or wholly written during ill-health; and it is a common experience that disease greatly distorts any writing. A signature under a will writ-

ten in such circumstances in most cases greatly differs from the testator's habitual hand, and is therefore exposed to suspicion.

Now ill-health is not the only distorting factor in handwriting. We know that any script differs according to the care or negligence with which it has been produced, and these again greatly differ with the rate of speed of the writing movement.

Knowing this, bankers all over the world have safeguarded themselves against the misuse of travellers' cheques by special stipulations about their usage. Should travellers' cheques get lost and no precautions be taken, a dishonest finder would be provided with all the facilities for forgery. The practice with travellers' cheques is that each cheque has to be signed twice, once in the presence of the clerk of the bank of issue, and the second time in the presence of the clerk of the bank where the cheque is presented for payment. Suppose now that a book of travellers' cheques is lost, and found by somebody who wants to misuse it. He would be supplied with a collection of genuine signatures, would be given sufficient time to practice these signatures, and then at leisure to produce a second supplementary signature on the cheque and present it for cashing. This he is not allowed to do. Instead he has to put the second signature on the cheque in the presence of the clerk to whom he presents it. More frequently than not, a forger would succeed if allowed to write the signature privately; but it is quite another thing to be called upon to write another person's name at a moment's notice in the presence of a watching clerk, and to do so with a quick, spontaneous, and natural movement. It is rightly assumed that this practice will reduce the risk of forgery to an almost negligible degree.

So rare are forgeries with travellers' cheques all over the world, that we can take this as almost conclusive evidence for the correctness of the centuries-old belief that a man's signature, when written with quick and natural movements, has to be regarded as a unique performance of each individual personality.

Graphology also has taken this for granted, and so far nowhere in the literature has the question been raised whether two different persons, while writing quickly, could possibly produce, not only the same signature, which is after all an assemblage of a small number of characters only, but a whole bulk of writing in a consistent style which would show all the idiosyncrasies of one personality and of no other.

* * * *

In the present paper it will be shown that this assumption is not quite correct, and that there are cases where different persons write an identical hand, which means a chirography which would be so strikingly similar in all conspicuous features that it would not only mislead the laymen (among whom practically all bank clerks dealing with their clients' signatures must be counted), but also the expert who has made it a life-long study to examine, measure, and compare all those inconspicuous features which are particularly typical of an individual's hand, features which do not strike the eye, which are, in fact, hardly ever noticed, and for this reason bound to remain unchanged even where a disguise of the own hand, or an imitation of somebody else's is attempted.

It has been established on the one hand that the script of any writer shows, up to a certain limit, variations in practically all features, and on the other, that the identity of all features in two handwritings form conclusive evidence that at least one of them has been traced instead of written, or that possibly both writings have been traced from a common model. The forensic expert in handwriting would declare two handwritings to be identical only if there was that degree of *variations* in certain features which must be regarded as typical of any natural hand, and if at the same time there was not such an *identity* of all features as to show that we are not dealing with an actual writing, but with a tracing, i.e., with a forgery.[1]

To understand this one has to keep in mind that even so simple a form as the figure "1" can be written in 857×10^{23} of variations,[2] and that all the other forms of the ten Arabic numerals, the twenty-six capitals and the twenty-six small letters, are more complicated still; so that we would arrive at a figure of such astronomic dimensions that it is inconceivable that a person should write any lengthy text in absolutely identical form twice in the course of his life.

Therefore it is not the actual identity of the shape of each character, of the size, pressure, interspace, etc., which serves as circumstantial evidence when the identity or non-identity of two handwritings has to be gauged, but rather the simultaneous occurrence of a great number of idiosyncrasies, among which again all inconspicuous parts of the writing are of greater importance than the conspicuous

[1] R. Saudek, *Anonymous Letters, a Study in Crime and Handwriting* (London: Methuen and Co., 1933), pp. 66-67.

[2] J. Crépieux-Jamin, *Les bases fondamentales de la graphologie* (Paris: F. Alean).

ones, after due allowance has been made for a certain amount of variations.

This leading principle, on which the forensic expertise on handwriting is mainly based, is not always easy to apply in practice, plausible as the rule may sound. We know that a certain degree of variations in two handwritings even of the same person must be present if both are natural and not disguised writings, but there is no definite rule about the extent of these variations. Too many of such differences suggest of course the non-identity of the writer, and too few look rather suspicious. This is as a matter of fact the main reason why experts so often disagree in the courts. Only a life-long experience enables an expert definitely to say whether he is dealing with a case of too few or too many dissimilarities.

Let us examine from this point of view figures 1 and 2. They are the handwritings of two identical twin sisters, who have spent all their life together, have chosen the same career, are working in the same store, in fact in the same department, sharing each other's likes and dislikes, hardly varying in their experiences of life, and being so much identical in their character and personality as ever-varying Nature will allow. Even when writing from dictation they would up to the second finish at the same moment; and since the size of their characters is about equal and the shape of the letters does not differ so far as simplifications or ornamentations and flourishes are concerned, we may take it that they wrote with equal rhythm and at an almost identical rate of speed.

When we now compare the two scripts of the sisters Sussman, we can easily discover quite a number of dissimilarities. To mention only a few, the second line of the text of Betty starts with a straight, spontaneous up-stroke in the "w" of "winning"; whereas the same word in Rhoda's writing starts with a so-called "initial adjustment,"[3] which means a dot at the beginning of the initial up-stroke. Or, to mention another instance, although the length of the lines is about equal, Betty writes six words on a line, whereas Rhoda manages to get in another two words "to the" on the same line. No wonder Betty takes nineteen lines for a text which Rhoda crowds into seventeen lines only.

Rhoda's habit of starting words with an initial adjustment can be traced throughout the whole script. The first word "Street" in

[3] R. Saudek, *Experiments with Handwriting* (London: G. Allen and Unwin; New York: W. Morrow and Co.), pp. 223 *et seq.*

the first line is written with a straight, spontaneous, upward movement in Betty's hand, but with a strange angular shape in Rhoda's; there we notice first a thin hair-stroke running downwards, and then only at the end of it the up-stroke starts, covering on its way part of the preceding down-stroke.

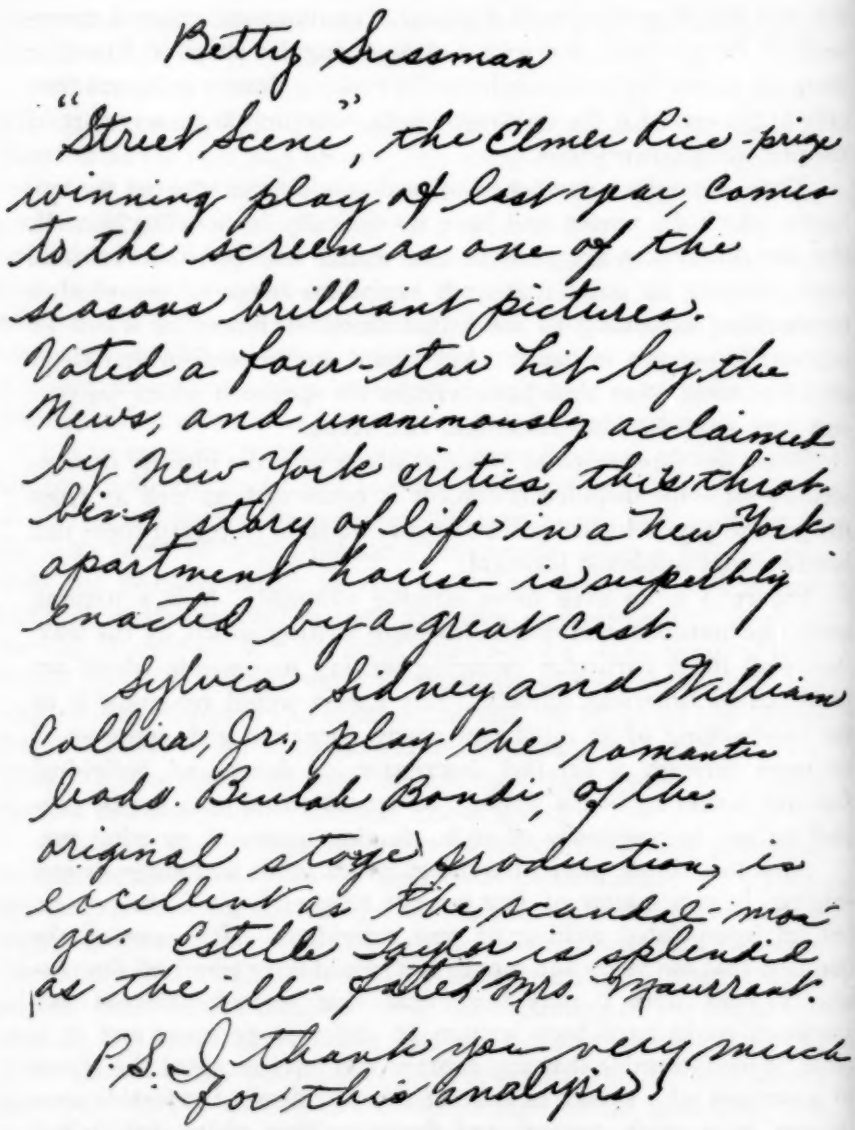
There are quite a number of other dissimilarities between the two hands which the reader will have no difficulty in noticing himself, but the differences are such as one would find in either habitual hand, keeping in mind that such variations occur in everybody's handwriting according to the actual mood or fitness in which he happens to put pen to paper. Any expert would confirm that Betty might at some other time have written the specimen which we present here from Rhoda's hand, and vice versa.

From the forensic point of view, where only the identity or non-identity of some disputed document is concerned, as well as from the general psychological point of view, we have to regard these two handwritings as almost identical.

Figure 3 is an even more striking example. It is a natural, quick, spontaneous, and fluent American writing which, by the way, shows all those particular swinging writing movements which are practiced in American schools. Any expert would recognize it as the handwriting of an intelligent young American girl, and even if he went through a detailed description of dozens of individual features occurring in the writing, he would on no occasion be puzzled by any inconsistency of style, shaping, pressure, or what not.

Now this simple piece of writing, which in no way suggests any enigma, is as a matter of fact not the handwriting of one person, but an interpolated writing of *two* individuals. It is out of the question that ten years ago any expert would have admitted the possibility, even were it only theoretical, that various parts of this specimen could have been written by different persons; and it is quite as inconceivable that any court would have accepted the report of an expert who would, in spite of those evidently irrefutable similarities in a quick, natural, and fluent writing, claim that it had been written by two persons and not by one only.

What are now the actual facts? The first six lines were written by Benita L. C. . . . and the final six lines by Minnette L. C. . . . They are twin sisters, and were twenty when they wrote the two letters from which twice six lines have been chosen for our illustration.



Betty Sussman

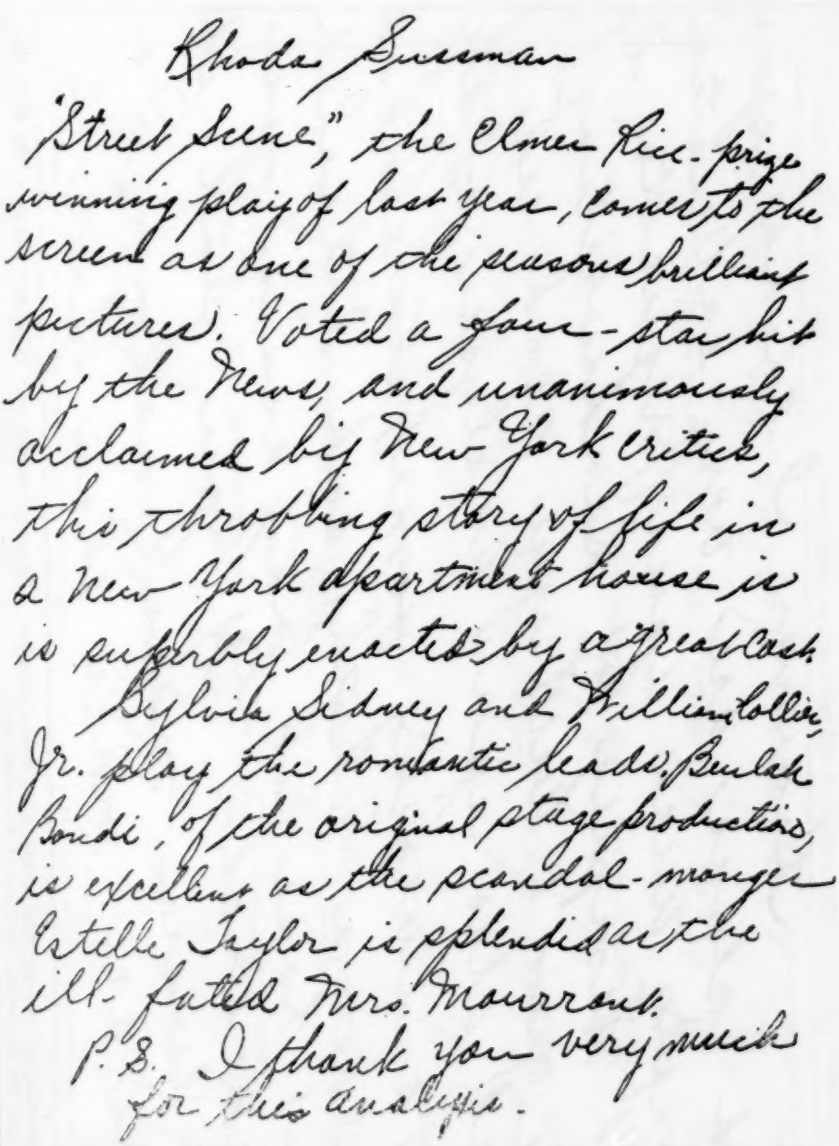
"Street Scene", the Elmer Rice-prize winning play of last year, comes to the screen as one of the seasons brilliant pictures. Voted a four-star hit by the News, and unanimously acclaimed by New York critics, this throbbing story of life in a New York apartment house is superbly enacted by a great cast.

Sylvia Sidney and William Collins, Jr., play the romantic leads. Beulah Bondi, of the original stage production, is excellent as the scandal-monger. Estelle Taylor is splendid as the ill-fated Mrs. Maurrant.

P.S. I thank you very much for this analysis!

FIG. 1. American, 18 years; compare with the handwriting of her identical twin-sister Fig. 2.

Up to that time they had grown up in the same environment, attended the same schools, and insisted on not being separated. The result of equal heredity and equal environment was an almost iden-



Rhoda Grossman

"Street Scene," the Elmer Rice-prize winning play of last year, comes to the screen as one of the season's brilliant pictures. Voted a four-star hit by the News, and unanimously acclaimed by New York critics, this throbbing story of life in a New York apartment house is superbly enacted by a great cast. Sylvia Sidney and William Collier, Jr. play the romantic leads, Beulah Bondi, of the original stage production, is excellent as the scandal-monger Estelle Taylor is splendid as the ill-fated Mrs. Maurrant.

P.S. I thank you very much for this analysis.

FIG. 2. American, 18 years; compare with the handwriting of her identical twin-sister Fig. 1.

tical personality, so far as we can judge from their handwriting. The specimen reproduced here is probably unique of its kind.

Not quite so striking is the case illustrated in Figure 4. At a

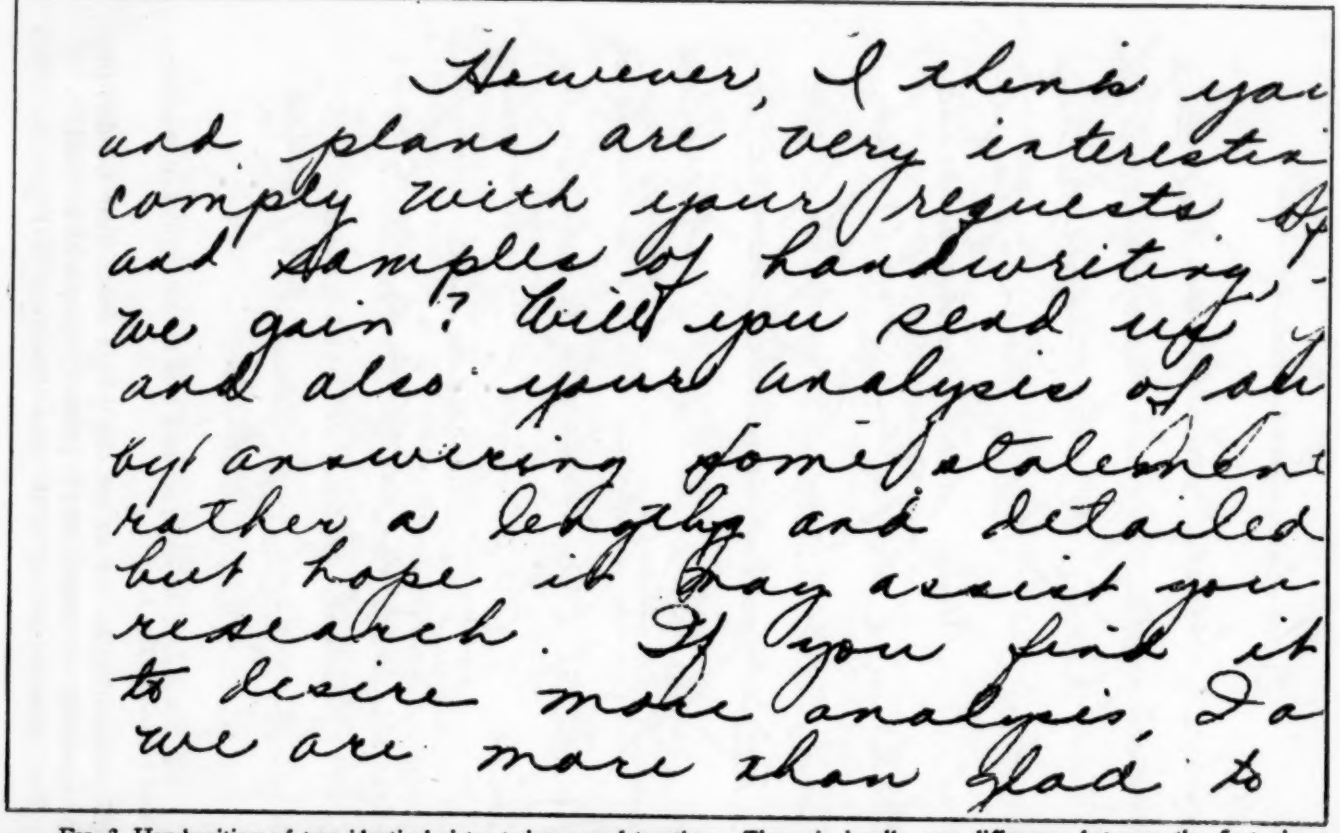

However, I think you
and plans are very interesting
comply with your requests &
and samples of handwriting,
we gain? Will you read up
and also your analysis of ab
by answering some detailed
rather a lengthy and detailed
but hope it may assist you
research. If you find it
to desire more analysis, I a
we are more than glad to

FIG. 3. Handwriting of two identical sister-twins reared together. There is hardly any difference between the first six lines of the one and the following six lines of the other twin.

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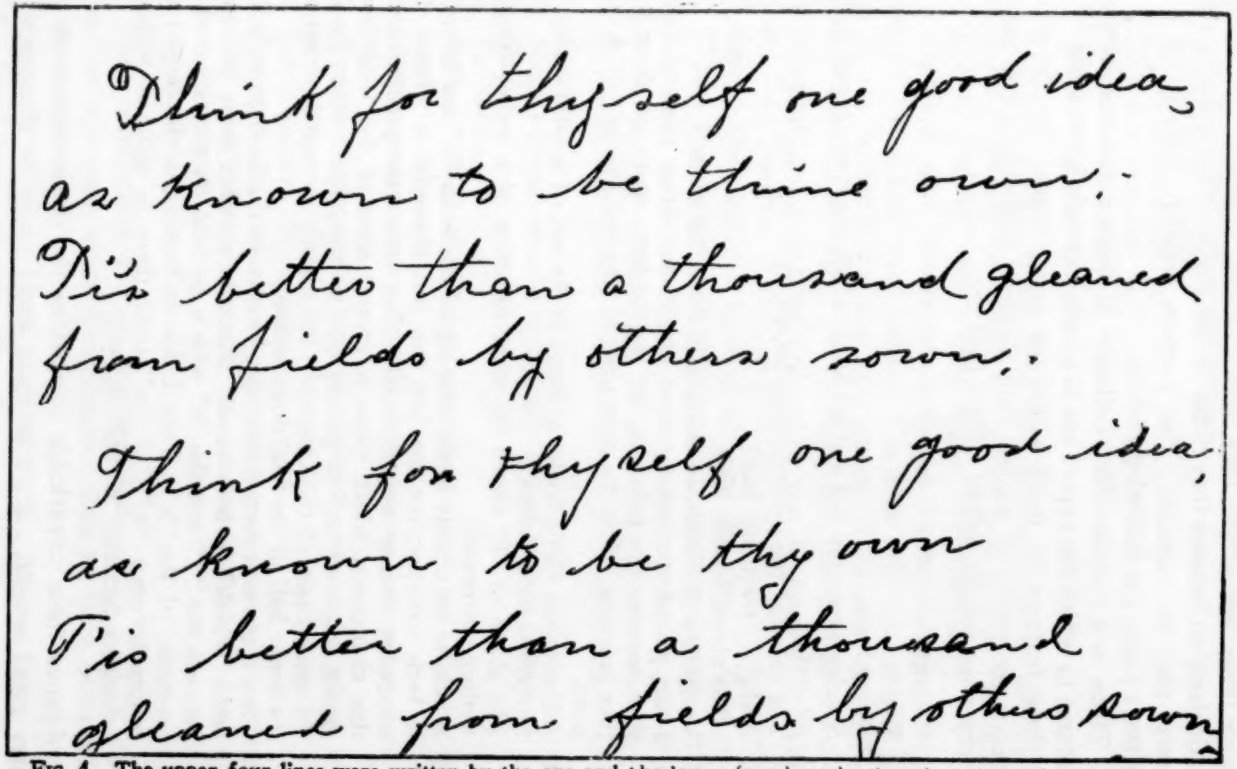

Think for thyself one good idea,
as known to be thine own:
'Tis better than a thousand gleaned
from fields by others sown.
Think for thyself one good idea,
as known to be thy own
T'is better than a thousand
gleaned from fields by others sown

FIG. 4. The upper four lines were written by the one and the lower four lines by the other identical twin-sister.

glance these two scripts may seem different indeed to the layman, particularly so because they differ in the shape of conspicuous characters, viz., the capitals. But a more detailed analysis of both writings yields the following findings.

There is a considerable similarity in quite a number of those features to which the expert has to attach a certain importance. Any of these features by itself would not prove much, but the simultaneous occurrence of not less than fourteen such similarities carries a very great weight indeed. Here they are:

1. Pressure.
2. Width.
3. Rising lines.
4. Spacing (compare 3rd and 4th lines, which are closer together than the rest).
5. The shape of the inconspicuous letters, "e," "m," "n," "u."
6. A slightly trembling hand.
7. i-dots placed equally high.
8. Variability of numerous features is about the same.
9. t-bars placed at about the same height, and either prolonged (and then crossing the following "h" on the same spot), or short (and then touching "h" in the same place); they end mostly with a sharp point.
10. Adjustments (little hooks or dots) at the end of several words.
11. Simplified letter-forms.
12. The shape of "f" shows the same direction of a rather complex writing movement.
13. A similar peculiarity in the shaping of the letter "k" can be traced in both writings; not the fact that this character is written in a somewhat clumsy way is decisive, but rather the peculiarities of this clumsiness, which cause a greater slant of the long down-stroke, a similar way of putting pen to paper again when shaping the second part of this character, the slightly increased pressure in the lower half of the final down-stroke.
14. Then there is a remarkable idiosyncrasy in the interspaces in the word "Think" in both cases. There is a rather large interspace between the "T" and the "h" with a particularly prolonged initial up-stroke of the "h." Then follow in both cases the same interspaces between "h," "i," "n," until there is again a widening interspace between "n" and "k," etc.

Against these remarkable similarities the dissimilarities do not carry great weight. Most of them could easily be discounted as variations normally occurring in one and the same hand. Here they are:

1. Somewhat different size-ratio.
2. Loopiness in upper projections.
3. Lower loops differ.
4. Different shapes of "a," "o."
5. Different shape of "w."
6. Ornamentations.
7. Signature.

Should the identity of these two handwritings be disputed in court, the experts in the witness box would have to give their opinion in favor of identity "with a great degree of probability."

Figure 5 again shows specimens of the handwritings of two identical twins, Letha and Leton. The main difference, which practically any reader will notice at a glance, consists in the different slant of the two writings; but we know that the slant is one of the characteristics of a handwriting which can be most easily altered at will. As a matter of fact, most writers of anonymous letters try to disguise their habitual hand by altering the slant of their script.

If now an expert should have to decide whether the two writings have or have not been written by the same person, he would certainly not stop to consider the different slant of the two writings, but he would have to state the following significant similarities:

1. Pressure.
2. Shape of inconspicuous forms such as "i," "m," "n," "u."
3. Size.
4. Variability.
5. Ratio of initial small letters as compared with the following small letters of the word.
6. t-bars sometimes cross the stem, sometimes only touch it from the left.
7. Simplified letter-forms revealing the influence of the school copy.
8. Size-ratio.
9. Interruptions after capitals.
10. A remarkable similarity of the writing movement in the character "R," which amounts to more than just a similar form; and quite as characteristic is
11. the similar shaping of the "M."

These similarities are of considerable weight. Still, a closer examination reveals more dissimilarities than we have observed in the previous case:

1. Width.
2. Spacing.
3. i-dots.

Regarding maternal ancestors, see census of 1790, Mecklenburg County, North Carolina, under name of Cathey. For number 2 in letter vide above as a specimen of handwriting.

Lutha Adams

Regarding maternal ancestors see census of 1790, Mecklenburg County, North Carolina, under name of Cathey. For number 2 in letter vide above as a specimen of handwriting.

Lutha Adams

FIG. 5. The handwritings of identical twins.

4. Shape of "a," "o," "r."
5. Lower projections (size and form).
6. Form of "f."
7. Different shape of a number of other letters ("c," "s," "k," "p," "C," "F").

To decide the question of identity would not be an easy one. Many experts would probably hesitate to give a definite verdict, and it is not improbable that the opinions would be divided. Theoretically speaking, one could not object seriously to the conclusion that the differences of the two scripts are still in accordance with the assumption of identity of the two writers; the more so, as the two girls are rather impressionable. Handwriting experts know that sensitive people cannot help unwittingly changing the appearance of their handwriting when writing under the influence of changed circumstances.

Handwriting is conditioned by many coöperating factors. We do not know precisely the number of these factors, but the author claims that he has succeeded in isolating twelve of these experimentally,[4] and it is evident that the more such factors two writers have in common the more their handwritings are bound to be, or to appear, similar. While now most pupils of the same school form, even when they have from the beginning been trained by the same teacher from the same school-copy, write more or less differently, there is no doubt that their scripts show more similarities to each other than the writing of any pupil of a different form taught by a different teacher.

Quite in the same way, it is plain that a number of writers of the same nationality will produce scripts which will, particularly in their conspicuous features, resemble each other more than any handwriting of one national would resemble that of a writer of a different nationality.

Those numerous experts who had to testify to the genuineness of a certain document in the famous Dreyfus trial were confronted with particular difficulties, because both persons suspected of the authorship of the famous "bordereau" in the various stages of the trial, viz., Dreyfus and Esterhazy, had so many traits in common that their handwritings were bound to look similar to a certain extent. The two men were both officers of the general staff of the French army, so that their training was very similar. They were both Frenchmen, of about the same age, and so on.

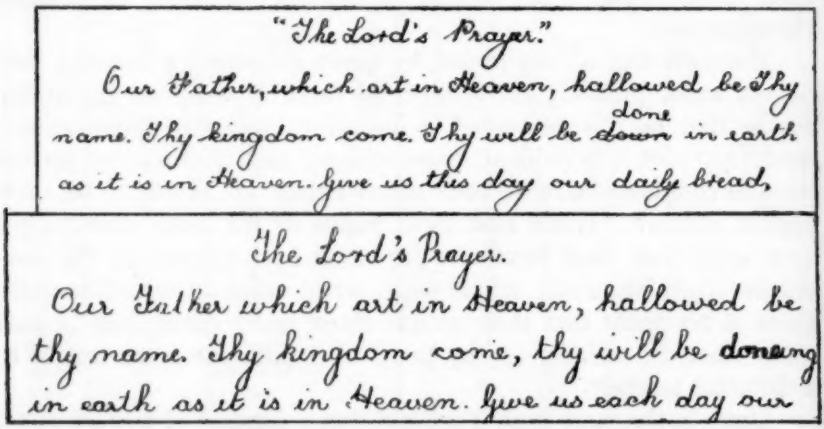
But even persons, who are apparently conditioned by the same environment, have in fact to go through so many different experiences in the course of their lives, that their handwritings, even should they have been strikingly similar in youth, grow more and more

[4] *Experiments with Handwriting*, pp. 235 *et seq.*

FIG. 5. The handwritings of identical twins.

different as years go on. The psychological differentiation is less marked in children than in adults; and the actual influence of the school training predominates of course with pupils at an early age more than with undergraduates at a university.

Figures 6 shows the handwriting of two girls of eleven, both pupils of the school of the Royal Hospital for the Deaf in Edinburgh. Though they are in no way related, and did not know each other till they met in school, their handwritings are strikingly sim-


"The Lord's Prayer."

Our Father, which art in Heaven, hallowed be Thy name. Thy kingdom come. Thy will be done (done) in earth as it is in Heaven. Give us this day our daily bread,

The Lord's Prayer.

Our Father which art in Heaven, hallowed be thy name. Thy kingdom come, thy will be done (done) in earth as it is in Heaven. Give us each day our

FIG. 6. Very similar writings of two deaf girls of 11, neither related nor particularly befriended, but in the same school form.

ilar, not only in the conspicuous, but also in the inconspicuous parts. As a matter of fact, the main difference is that the one script is larger than the other; but the size-ratio between the various types of characters, viz., long, medium, and short letters, is about the same in both cases. Where there are mistakes in the writing, the lapses occur in the same place. When writing the Lord's Prayer, they both stumble over the word "done" in "Thy Will be done"; though the one corrects the mistake in a manner different from that of the other.

This example is in no way typical of frequent cases, but rather almost unique in its way.

We have so far no statistics about the frequency of identical or almost identical handwritings of different persons; the present paper merely gives some data about the frequency of this phenomenon in the handwriting of twins. As a matter of fact, a few years ago the occurrence of identical handwritings in different persons was thought

to be inconceivable, in fact, rather a contradiction in itself; or, to put it in another way, one would have taken it for a refutation of the main graphological doctrine.

The author is, so far as he knows, the first to show such a possibility. He came across this phenomenon only after having collected and graphologically examined a great number of handwritings of identical twins. His statistics cover 234 such pairs, and he has found identical handwritings in about five per cent of these.

Considering that one pair of twins is born out of 85.2 children, and that there is approximately one pair of identical to three of fraternal twins, one pair of identical twins is born out of 340.8 children.

If now in five per cent of these cases we should expect to find identical handwritings, we should arrive at the figure of 6,816. But this purely theoretical calculation does not hold good in practice, because in many cases the one twin dies in infancy, were it only for accidental reasons, while the other grows up, and because in many other cases neither twin may live to school age. It is the author's view that on an average we may expect to come across identical handwritings once in about ten thousand persons, leaving out those cases where other causes than identical birth may produce such a spectacular incident. No statistics on this puzzling phenomenon are available so far.

TEMPERAMENT AND DISPOSITION REVEALED IN YOUNG CHILDREN'S MUSIC

WILLIAM PLATT
London

This article is not exclusively for musicians. Psychologists can discuss and understand basic principles without necessarily knowing the intricacies of the arts. Darwin, in Chapter XIX of *The Descent of Man,* discusses the musical side of Man's activities with considerable skill though he was not himself a musician. But I speak as one thoroughly trained in Musical Composition, and this technical skill will help me to expound in a way that I hope all my readers will be able to follow.

Darwin's tendency was to class the musical side with the erotic manifestations. Modern psychologists would place the musical activities with the more general phenomena of the assertion of the Ego. The moderns are undoubtedly right.

Can music illustrate temperament and disposition? Musicians think so. Beethoven, Mozart, Schubert, Wagner, each of these remarkable personalities is, to us music-lovers, far more clearly revealed in his creative work than is the personality of Shakespeare or Goethe in theirs. It is controversial, but it would be hard to convince musicians that they are wrong in this.

To our way of thinking, great music comes from deeper sources, is more occult, more mysterious, less easy to be juggled with, therefore essentially sincere.

Let us come at once to the children. Seeking for musical signs, I have for over thirty years watched babes in their cradles and toddlers in their nurseries. Young children react very decidedly to music. The infant, lying on his back, murmurs in a soft, crooning voice a monotone; but the note is sustained, its pitch can be verified, it is from the first more akin to music than to speech. Already at three months some infants will repeat softly the keynote of some piece of music that has just been concluded, either on the wireless or in the

room. Such notes are almost invariably pitched correctly. Quite evidently the reaction is a natural and a pleasing one. Possibly it is akin to the murmured "Amen" by which the congregation identifies itself with the prayer. The child, so to speak, annexes the music to his sphere.

At three months also the infant may make his first excursion from the monotone to a kindred note, thus uttering his first two-note cadence. Usually this takes the form of a descending fourth, that is to say, from Doh to the Soh beneath. Musical intervals always stand, of course, in a definite ratio of pitch, the one to the other. The ratio of the descending fourth is 4 : 3 a very simple one. Such fourths are to be found among the cries of some animals, as well as in the inanimate sounds of wild Nature—for instance, sometimes in the crunchings of the pebbles upon a beach. Simple; natural.

The descending major third is the next frequent early interval. This is from Me to Doh, and stands in a ratio of 5 : 4. The octave is in the simplest ratio, i.e., 2 : 1, but is vocally speaking harder to produce. Yet I have heard it, though not frequently, from children of under one year old.

One bright and musical little girl, aged only seven months, definitely and repeatedly expressed joy by a crooned Octave, uttering the upper note first and with an indrawn breath, and the lower tone, quite in tune, with the outspent breath. The effect was both individual and apt.

To those who wish to check my observations by their own I would give a word of warning. Do not expect or listen for loud sounds. The very young child gently murmurs these cadences. Give all your attention to the infant, never mind what the elders are saying. Softly, very softly, but quite clearly and tunefully he sighs his little cadence, and you will be rewarded, as I have so often been. A moment of romance.

What temperament is there in such murmured tones? Very little thus far, I will admit. Musically speaking, the fourth is usually expressive of bold effects, the third of much more gentle ones. Even in the infant, the former is apt to be the more resolute, the latter more dreamy and caressive. But the difference is slight at first. So long as the infant is murmuring his sounds, disposition is hard to find. Temperament comes into being when he begins to call out boldly as well as to croon softly. Cries of pain are of course excluded as being outside the scope of this article by their very nature.

The child needs to be nearly a year old before much dynamism is apparent. I have found it in very musical children at ten months.

But first let us ask whence the child derives his tendency to murmur cadences. This is partly imitation, as he clearly shows when repeating key-notes. Remember that both nurse and mother tend to sing to him from the very start of his life. But such imitation must clearly be strongly backed up by the fact that early man surely uttered emotional sounds (i.e., more or less musical sounds) before he developed the complicated system known as speech. Deep down within the child lie buried race-memories of old emotional cadences, brought to light when he hears something kindred which he is stimulated to imitate.

Adult speech must also be to the child a blur of inflected sound. When we know nothing of a language we listen the more closely for its inflexions.

After the first year is passed, the child makes bolder and longer efforts. Soon he sings little sentences which adults normally speak. "Pass the bread and butter, please"; "I don't know where it is"; "It's nice jam"; "There are chocolates there"; "I saw the pussies"; these and similar sentences are sung instead of being merely spoken. Often words, music, and actions go together, as when a three-year-old brings in his father's slippers with a comic shuffling march in time with the rhythmic cadence of "Daddy's slippers, Daddy's slippers. . . ."

Now we can begin to differentiate between the styles of various child-composers.

Children's tunes always possess spontaneity and purpose. Never once does a child produce that most inartistic thing, music machine—made for a commercial end. He has a natural sense of symmetry. His tunes divide into the active and the dreamy, a classification that also applies to classic music. Some children incline to the dreamy, others to the bustling side. No child is entirely bound to the one or the other. Active, lively tunes have marked rhythms, and upon the whole lean upon Doh and Soh and their chords. Dreamy tunes have a more languorous rhythm and incline towards the romantic Lah without being actually in the minor, which I find rare among child tunes. Many dreamy tunes end on some note other than the key-note.

Actual examples must now be discussed. I quote here ten tunes, all but one being published for the first time. Those who would seek

for further examples will find them in the *Proceedings of the Child-Study Society,* Vol. VI (1926), or in my little book *Child-music.*

Tune A shows the descending fourth. It was uttered by an infant only two and a half months old, the earliest of my examples. Tune B, from a babe aged four months, shows distinct "doggy" influence. Dogs bark with a slurred upward fifth, or occasionally with an octave. I have often heard children under a year old imitate this, but example B is a very early specimen indeed.

It may provoke surprise that so young a child should exhibit so remarkable a power of observation and imitation, but what I have actually heard on this and other occasions convinces me that the babe's sense of hearing is developed to an acuteness that has never been realized before.

Tune C interests me very much. Children are of course always interested in their physical mechanism, and I have more than once found them intrigued by the fact that they can "sing both high and low." Sometimes they deliberately experiment with this, jumping from high to low, or vice versa, just for the fun of the thing, so to speak. This little boy, aged barely two and a half years, certainly did so.

Tune D is quite remarkable. This little girl, aged seventeen months, was riding with me in a motor-car. The rumble of the car inspired her, as it often does, and with this rumble as a bass note she made up the dreamy tune with its consistent twenty-two bars. Try it on the pianoforte with a tremolo F-C bass to represent the noise of the car.

Tune E, boy, aged two and a fourth years, is a fine example of the dreamy method, ending on La with a charming tenderness. This lad had a natural bent towards such endings.

Tune F, girl, aged two and three-fourths years, is a compromise between dream and drama. Though expressive of action, it dealt with imagined action only; hence its descent into a minor key suggestion, which is got very skilfully, this time with the aid of Ray and Fah. This girl's tunes, always clever, are usually of the active type.

G, a small snatch, from a girl of about four, contrasts the tender third for "Mummy" with the bustling fifth for "Hurry up."

Tune H, another small cadence (Boy, aged two and a fourth years) shows a pleasantly dreamy leaning upon Fah and Lah.

Tune J, from a boy aged six years, swings along vigorously, relying chiefly upon Doh for its power. It modulates into the dominant

A
O . . . . . .
B
SLURRED
C
Nice Jam!
D
Ah . . . . . .
E
I saw the pussies in grannie's window
F
Will you open the door for my marbles?
G
Mummy, hurry up!
H
Ah!
J
Ah!
K
I'm getting one for Daddy, I'm getting one for you.
L
Such a lot of bats in grand-pa's
belfry, Sixteen hundred bats in
grand-pa's belfry!
V. Platt
1933.

(Soh's key) at the end. It is interesting because of its similarity to the main theme of the first movement of Beethoven's Heroic Symphony, which this boy had certainly NOT heard.

Tune K, boy, three and a half years, picking flowers; fragrant as a flower itself.

Tune L. I was out with two grandchildren. A bat flew over our heads. The little girl, aged five and a fourth years, asked:

"What was that?"

"A bat, my dear."

"Oh, I say. . . . And what do people mean when they say that someone has bats in the belfry?"

I explained. Immediately the tune and words rang out, swinging along with its fine Soh and Doh harmonies, swift as an arrow and as straight to the mark.

NEWS AND NOTES

Great Britain

Continuation of McDougall's Lamarckian Experiment

In a third report on the experiments which were meant to show whether acquired mental traits are, or are not, transmitted to the following generations, Dr. McDougall gives the results to which he and his collaborator, J. B. Rhine, have come when experimenting with rats in the twenty-fourth to thirty-fourth generations (*Br. Jrnl. Psy. General Section*, XXIV, No. 2 [Oct., 1933]).

It will be remembered that Dr. McDougall used a tank so constructed that the rats had the choice between two gangways to escape from the water in which they were immersed, the one gangway brightly, and the other dimly lit. On entering the brightly lit gangway they would receive an electric shock, while encountering no such obstacle in the dimly lit gangway.

Dr. McDougall's latest tables show that the later generations learned more quickly to avoid the brightly lit gangway than the earlier generations. While, for instance, in the thirteenth generation the rats made eighty-eight mistakes on an average before learning to prefer the dimly lit gangway, in the thirty-second generation only an average of seventeen mistakes was recorded.

True, this improvement does not develop regularly and steadily from generation to generation, but rather in periods with short regressions in between. For instance, after a marked improvement in the seventeenth generation, less efficient performances are noted in the following two generations; after which again a marked improvement takes place in the course of several generations, only to be followed by a renewed falling off of the scores until finally in the thirtieth generation a remarkable improvement is observed. Still more impressive are the results obtained with the "best" rats. We see that in the thirteenth generation the best rat made thirty mistakes, while in each of the last five generations several rats learned after three, and in the final experiment after only two mistakes, to avoid the brightly-lit, electrified gangway.

Though Dr. McDougall compared the performances of these trained tank rats with various untrained stocks (which showed worse results altogether), and though he applied also some other control methods, some critics doubted the reliability of his conclusion that acquired traits are transmitted. They suggested that these experimenters may have unwittingly selected the more talented rats for breeding.

To these critics Dr. McDougall submits that their objection is met by a second series of experiments in which training was combined with strongly adverse selection. Even when those rats were selected for breeding which in each generation showed the worst results, there was a marked improvement in efficiency in the successive generations.

Incidentally, these control experiments with the worst rats showed that the training in the course of a number of successive generations suddenly developed an "instinctive" preference for the dimly lit gangway in

the sixteenth generation. In a preliminary test, at a time when neither gangway was electrified, it was noticed that the rats of earlier generations showed a slight preference for the brightly lit gangway, while the youngest generations showed a sudden change in favor of the dimly lit gangway, although they have not yet had the experience that the brightly lit gangway was electrified.

This change, which we notice also in the thirty-third and thirty-fourth generations of the unselected tank rats, appears so sudden that Dr. McDougall is rather inclined to assume a mutation due to continued training of the preceding generations.

The opposite experiment with the selection of the best rats was not successful, because the rats of this group happened to die off after a few generations; but it appears that the improvement in the later generations does not depend upon such a selection.

Dr. McDougall thinks that his results suggest the transmission of acquired traits. To those critics who believe that the later generations might have been instructed by their parents, or in some way influenced by their example, Dr. McDougall points out that the improvement is also noticeable when the younger generations have been reared by foster-parents of controlled stock (i.e., untrained, and of untrained ancestry).

Furthermore, the improvement increases through many generations. If the assumption that the parents have influenced the conduct of the young by their example held good, a single generation of training should give results as well marked as those of many generations of training.

This preliminary reply sounds convincing enough, although Dr. McDougall proposes to return to the argument of his critics more at length later on.

On the other hand, it should be admitted that his technique involves the possibility of errors, viz., the application of a new tank in the course of the experiments might have introduced some new factor, since the experimenters themselves state that the rats found the new tank easier than the original one.

Though Dr. McDougall tried to figure out some definite coefficient between the two tanks, there still remains some doubt whether his conclusions may be taken as generally valid, since F. A. E. Crew's experiments, carried through five generations with other methods, failed to confirm McDougall's findings.

However, there is little doubt that the figures of McDougall and Rhine form a strong argument in favor of the Lamarckian thesis. Further experimentation with the new tank will show whether the present findings may be accepted as conclusive.

MELOUN.

Is the Frequency of Dreams a Symptom of Emotional Instability?

F. K. Berrien, of Ohio University, expresses doubts about the correctness of the Freudian doctrine that dreams and emotional instability have a common basis. In the *Journal of Abnormal and Social Psychology*, XXVIII, No. 2, he reports on a statistical enquiry with eighty-one academically trained persons. He found the correlation between the frequency of remembered dreams on the one hand, and two tests of psycho-neurotic disposition on the other, to be insignificant though positive.

Although it sounds plausible that, as he claims, "something besides emotional instability is measured by these two scales," his method seems to be inadequate in two respects: viz., (1) he considered only the frequency, but not the quality, wealth, and

"color" of remembered dreams, and (2) his subjects were students whose emotional instability has been differentiated only by means of psychoneurotic tests. Might not the difference between emotionally stable and unstable persons, as measured by questionnaires, be too slight to allow of definite conclusions? I submit that the validity of Berrien's claims should be checked by experiments with psychopathic clinical cases.

A Racial Difference in Perception

R. H. Thouless, Glasgow, discusses in the *Journal of Social Psychology*, IV, No. 3, the question why Oriental painting is lacking in shadows and, partially or totally, also in perspective. His experiments with Indian and English students suggest that this peculiarity is due not only (if at all) to "symbolic" representation, but also to a racially different perception. The phenomenon called "phenomenal regression to the real characters of objects" seems to be decidedly more frequent with Orientals. For instance, Indian students perceive an inclined circle not as a perspective ellipse, but almost as a circle. Or, to mention another instance, if a bigger and a smaller disc are placed at a distance which makes them appear of equal size to the European eye, they are not perceived in this way by most Orientals. Under the same conditions, the latter would perceive the bigger disc not as equal but as larger, although the retinal images of both discs are equal. The bigger disc must be removed much further from the Indian observer to be perceived as equal to the smaller.

MELOUN.

U. S. A.

American Association for the Advancement of Science

At the ninety-third meeting of the American Association for the Advancement of Science, which took place in Boston and vicinity, during the week of December 27 to January 2, there were eighty papers read of a psychological nature in sections I and Q, i.e., psychology and education. Although in Section Q there was a predominance of discussions around the subject of learning and education, it was evident from the topics of the papers that the line between education and psychology is imaginary, except that the latter comprises a good deal more. The only papers dealing directly with character and personality were read in Section Q (Education). The majority of the papers in Section I were limited to fifteen minutes and those in Section Q to ten minutes.

For the second time in a comparatively short period, a psychologist was elected president of the mammoth organization, which numbers over eighteen thousand members. Professor Thorndike of Teachers College, Columbia University, has been chosen to fill that office.

The Visagraph and Other Exhibits

Among the many exhibits shown at the meetings were the visagraph, an instrument which enables the blind to read any ordinary printed book by the sense of touch. This remarkable invention, perfected by Mr. Naumberg, makes use of photoelectric energy and a scanning device.

Professor W. R. Miles of the Institute of Human Relations, Yale University, exhibited a moving figure, similar to an electric sign, which might be interpreted in at least half a dozen different ways, depending on our attention and possibly a certain constitutional bias. While this device may serve as a model ambiguous figure, it may also be used for the purpose of classifying observers into types and studying them for diagnosis in a manner reminiscent of the exploitation of the Rorschach test.

The Bell Telephone laboratories exhibitors allowed visitors to speak into a mouthpiece and immediately hear their voice as transmitted over the telephone wires, thus perceiving how their own voice sounded to others.

Character and Personality a Separate Subject

It is gratifying to learn that the *American Year Book,* which is the authoritative reference work on progress for the year, in every human endeavor in the United States, has, at the present writer's suggestion, introduced a new department, viz., "Character and Personality," which was growing too unwieldy for inclusion under psychology.

At the same time, the periodical *Psychological Abstracts,* has also for the first time separated the items on character and personality from the general section on special mental conditions, a measure which was advised some time ago.

*Work in the Laboratories**

One of the most industrious psychological laboratories in the smaller Eastern universities is that at Brown University in Providence, Rhode Island, which is under the directorship of Professor Leonard Carmichael. Aside from studies on the *phi* phenomenon and on individual reactions to taste stimuli (carried out as a group experiment) Dr. Coronios is engaged in a problem of fetal behavior in the cat, while Dr. Karl Smith has been obtaining some results with regard to the visual perception of cats, which would indicate that the feline species can discriminate between a circle and a triangle or between a cross and a Z, even where the size is different, or when ground and pattern are reversed; in other words, the cat may be said to be capable of abstraction. Kinæsthesis is ruled out as a determiner by shifting the figures and incentives under control.

Mr. Pennington is endeavoring to prove that rats, even with parts of the cortex extirpated, can learn to localize sound.

* Under this caption, our correspondent will report some of the more interesting problems which are being worked on in the psychological laboratories of the American colleges.

Harvard Psychological Department

The department of psychology at Harvard University has achieved a certain independence from the department of philosophy by a ruling of the faculty. The schism has been gradually growing since 1920.

German Psychologists in the United States

Thus far only few refugee German psychologists have been called to American institutions. Max Wertheimer is lecturing at the New School for Social Research, while Kurt Lewin, another member of the Gestalt group, has joined the faculty of Cornell University. William Stern has been invited to Duke University for the coming semester.

"Margery" Again

Mrs. L. R. G. Crandon, or as she is better known both here and abroad, "Margery," is again the storm-centre of those who have an interest in the occult. The allegations that the thumb prints produced during the séances as her deceased brother Walter's, were those of a Boston dentist have aroused a good deal of comment both favorable and unfavorable in the Boston press. Space was also given to the début of Walter's "spirit voice" on the radio, which again is accepted by some as a *bona fide* phenomenon reaching us from the other world, and by others ridiculed as a hoax *de luxe.*

American Psychological Institution in France

Dr. Pearce Bailey announces the fact that a course in psychology with special reference to personality problems is being offered at the newly founded Institute of Educational Psychology in France during the academic year 1933-1934.

Eugenics Prize

A prize of $3000 is offered by the Eugenics Research Association of Cold Spring Harbor, Long Island, N. Y., for an original research on the "probability of commitment for a mental disorder of any kind, based on the individual's family history." An award of $1000 will be offered to the *proxime accessit.*

Necrology

Among the eminent psychologists, who passed away recently is Dr. Shepherd Ivory Franz, who died at the age of fifty-nine, in Los Angeles. His chief work was on brain localization, but he was interested in clinical and abnormal psychology to the same extent. For a number of years he edited the *Psychological Bulletin,* and later the *Psychological Monographs.* Just before his death, there appeared his *Persons One and Three;* and with Kate Gordon he had brought out previously a textbook of psychology.

The death of Professor H. C. Warren, at the age of sixty-six, only a week after he attended the meetings of the American Association for the Advancement of Science in Boston and brought the proofs of the first half of the monumental *Psychological Dictionary* to the printers, is a blow to the organization of American psychology. Although not one of the outstanding creative spirits in psychology, this genial little man with cheerful and sympathetic face, disfigured to some extent by a tragic accident many years ago, was one of the most earnest workers on behalf of the science. There was scarcely a meeting which he did not attend, taking part in the discussion and befriending the younger men. The organization of the many publications of the American Psychological Association is due to his zeal and energy. An able editor, he founded together with Mark Baldwin, the *Psychological Index* and the *Psychological Review,* and served on several committees of the American Psychological Association, of which he was president in 1913. His textbook *Human Psychology,* as well as his *History of the Association Psychology,* brought him to the fore as an able exponent of a system which was being combated on all sides. It is at least fortunate that his increasing blindness was stalled by a successful operation and that he was at least able to see his *Psychological Dictionary* in proof. It was undoubtedly the arduous editorial labors on this dictionary which hastened his death.

A. A. Roback.

Scandinavia

Until lately Scandinavian doctors interested in psychotherapy have—for want of special associations in their native countries—often been members of the renowned German Allgemeine Aerztliche Gesellschaft fuer Psychotherapie.

This association, however, which has done a very considerable work on the lines of psychotherapeutic research, and whose honorary presidents are no less authorities than Kretschmer, Marburg, Sommer, and Giessen, has lately been divided into a Deutsche Aerztliche Gesellschaft fuer Psychotherapie and a Ueberstaatliche Aerztliche Gesellschaft fuer Psychotherapie.

The president of the German section is now Professor Dr. Göring; the president for the International Association is Dr. C. G. Jung of Zürich.

The manager of the original association, Sanitaetsrat Dr. W. Cimbal of Altona, is, at least for the time being, connecting the two associations as their common manager.

Following on the above stated division, the medical men in the Scandinavian countries who are interested in psychology and working on psychotherapeutical lines are now —on the initiative of the present reviewer—establishing a Scandinavian Association for Medical Psychotherapy (Nordisk Selskab for Laegevidenskabelig Psykoterapi) to coöperate with the before mentioned International Association. This latter is formed by the various national sections, and is continuing, under the managing editorship of Dr. C. G. Jung of Zürich, the publication of the *Zentralblatt fuer Psychotherapie und Ihre Grenzgebiete.*

OLUF BRÜEL, Copenhagen.

BOOK REVIEWS

ANONYMOUS LETTERS: A STUDY IN CRIME AND HANDWRITING. By Robert Saudek. London: Methuen & Co., 1933. 8 plates, 11 illustrations, 8 vo. 5/-

The importance of this small book for the legal handwriting expertise is far beyond its size, for the author refers to facts which have hitherto not been treated in the literature. In the investigation of the authorship of disputed documents, it has always been tacitly assumed that two incontestably natural, spontaneous, rapid, and freely-written scripts which resemble each other closely in all essential features can have been produced only by one and the same writer. Saudek shows that this principle can claim no absolute validity. In about five per cent of identical twin-pairs reared together, the writings of the twins are indistinguishable from each other, so that in these cases the expert would have to declare both scripts to be produced by the same hand. Saudek also points out that people not related to each other may produce scripts which are natural and at the same time identical not only in numerous conspicuous, but also in their inconspicuous features. These conclusions, apart from their legal significance, have also an interest for the psychologist. The low percentage of extremely similar handwritings in monozygotic twins leads one to assume that education and environment have a more differentiating influence on the shaping of the individual handwriting (and on the formation of personality itself) than would appear to be the case according to the views of many research workers. Saudek, however, does not elaborate this theory, for his aim is to demonstrate on actual cases, in a compact form the problems of legal expertise from the standpoint of the latest research.

Here also the layman comes into his own. In the second chapter Saudek describes the famous historical case of Dreyfus, showing not only the dangerous errors of many of the "experts" of that time, but also the astonishingly correct conclusions of the experts called by the defense, but not accepted by the authorities.

Three further chapters deal with the psychology of the writers of anonymous letters. The principles of experimental handwriting expertise are not systematically laid down in the manner of a text-book, but demonstrated on the illustrations, including also cases of blackmail letters from American gangsters. Forgeries, in the detection of which chemical and photographic methods are applied, are treated only cursorily in the final chapter, so that the general conception of the book remains psychological rather than purely forensic.

MELOUN.

THE PSYCHOLOGY OF EFFECTIVE SPEAKING. By T. H. Pear. London: Kegan Paul, Trench, Trubner & Co., 1933. Pp. x, 232.

This book is more frankly practical and normative than Professor Pear's previous work in the same field, *Voice and Personality*. It demonstrates, first, that the act of speaking is distinct from speech, language, and elocution, in much the same way that style of performance on a musical instrument is distinct from, say, mus-

cular coördination, theories of harmony and of tone production. Next, the author argues, convincingly, that the style of speaking in ordinary conversation, in lectures, committees, debates, broadcast talks, etc., is often extremely bad. In part this is due to the existence of strong taboos against criticizing, or even mentioning, the speaking style of those to whom we have to listen, and in part to the complete lack of education in effective speaking at schools. Perhaps the most valuable part of the book is Chapters VIII-X, where definite suggestions and principles are put forward for the teaching of good speaking. Naturally these principles are very far from complete, since the field is a totally new one into which few besides Professor Pear have dared to venture.

Though the book is written for the layman, there is much in it of interest to the psychologist, for example, the comparison (Chapter XII) between clothing and speaking as forms of expression of the personality. Also there is the important practical point, namely, that it may stimulate psychologists to improve their own style of conversation and manner of lecturing.

P. E. VERNON.

PSYCHO-ANALYSIS AND ITS DERIVATIVES. By H. Crichton-Miller. The Home University Library of Modern Knowledge. New York: Henry Holt and Company; London: Thornton Butterworth, Ltd., 1933. Pp. 256. $1.25.

The task of the reviewer of a review is not directly to scrutinize the topic matter of the original material dealt with in the latter; it is rather to pass a verdict upon the skill and critical sagacity with which its author has inquired into his first hand material. From this point of view, it is my pleasure to acknowledge the quality of excellency in Dr. Crichton-Miller's little book. His task, to present in concise and comprehensive terms the psychological doctrines of Freud, Jung, and Adler, is by no means an easy one; for the essence of these doctrines has to be drawn from a giant body of special books and articles, some of which, as in the case of many works by Siegmund Freud, are highly obscure and not infrequently contradictory. Dr. Crichton-Miller has succeeded in giving an admirably logical and clear account of the psychologies mentioned and in the array of attempts of such kind his has to be ranked as one of the best. In addition to the presentation of his material, he offers critical and comparative chapters in which, on the one hand he emphasizes the points of divergence between psycho-analysis, analytic psychology and individual psychology; on the other hand, he summarizes the more important valid criticism that has been brought against these by various commentators, contributing also, in this connection, original arguments of his own to the discussion. In a special chapter, the author takes up the work of the late Hans Prinzhorn, especially in its relation to Freudian psycho-therapy.

Dr. Crichton-Miller is to be congratulated upon his contribution, just as the public is to be congratulated upon the availability in print of such a work.

HELGE LUNDHOLM.

A HUNDRED YEARS OF PSYCHOLOGY. By J. C. Flugel. London: Duckworth, 1933. Pp. 384. 15/-.

This book, the first history of psychology by a British writer, will be most useful to the beginning student; and it may be of considerable interest to the layman. It does not pretend to cater to advanced students, like Boring's and Murphy's histories (upon which it is largely founded). But it possesses certain advantages

over these more detailed manuals in that it is much more simply written, and that it tries to give a general view of all the main branches and applications of psychology. As the title indicates, it commences at 1833; hence there is little about the earliest origins of the subject; instead there is an interesting outline of the psychology which the student of 1833 might be expected to know. At the end there is a useful chronological table of events in psychology from 1807 to 1932, as well as an extensive bibliography.

The author admits in his preface that every reader will find omissions of some aspects of psychology, and over-emphasis of other aspects. Perhaps the most inadequate sections are those that deal with types and *Ausdruckslehre*, including graphology and methods of psychodiagnosis other than intelligence and educational tests. Conversely, it is surprising to find some mention of the London School of psychologists on about eleven per cent of the pages of the book, when Behaviorism (including Pavlov and reflexology) receives no more space, and the far more influential Gestalt School occupies only about seven per cent. There are several inaccuracies of detail. In the psychology of sound, for example, it is wrongly stated that Helmholtz's resonance theory had no forerunners; the intensity and phase theories of localization are mentioned, but not the more important time theory; and Seashore's researches, which have been concerned chiefly with the measurement of musical capacities of performers and listeners, are alleged to be the chief continuation of the work initiated by Helmholtz and Stumpf. A slight misprint in the bibliography should be pointed out, namely, the appearance of Hartshorne's name instead of Head's as the author of *Aphasia*.

On the whole, however, the author is broadminded in his treatment of the various schools, past and present. His chief object is to give students an opportunity of achieving an historical and developmental outlook on psychology, and this object would seem to be well fulfilled.

P. E. VERNON.

PSYCHO-ANALYSIS TODAY. Edited by Sandor Lorand. London: George Allen and Unwin, Ltd.; New York: W. W. Norton and Company. Pp. 370.

This book is a collection of short articles by twenty-four different authors, including Alexander, Brill, the late Sandor Ferenczi, Glover, Jones, Klein, Oberndorf, and Schilder. Not all the authors are analysts, and scarcely half can be held to be authorities on psycho-analysis. The scope of the book includes normal psychology, the whole range of psychiatry, internal medicine, anthropology, religion, literature, and criminology. The space allowed the individual authors is not sufficient to permit of a detailed treatment of their subjects, so that the evidence on which they base their theories obtains small mention. This is usually allowed for by copious references to the literature. Small as the space is, much of it is often spent in the recapitulation of the more general and familiar doctrines of psycho-analysis. Furthermore one would have hoped for a more general distinction to be drawn between fact and speculation. The sections on the psychoses are particularly open to criticism. In the article on manic-depressive psychoses, one finds the remarkable statement: "Constitution appears to play a minor rôle, if any at all. In other words manic-depressive psychoses do not appear to be inherited."

However, as would be expected from the names of the authors quoted, there are articles that are lucid and well-informed; and one regrets in these cases that considera-

tions of space prevented the authors from sufficiently elaborating their views. The book makes an ambitious attempt to give a composite picture of the whole advancing front of psycho-analysis, and, subject to the criticisms noted, though here and there the outline is somewhat blurred, it is on the whole successful. The book is pleasantly produced and indexed.

ELIOT SLATER.

THE TIDES OF LIFE. By R. G. Hoskins. New York: W. W. Norton and Company; London: Allen & Unwin, 1933. Pp. 352. $3.50 and 12/6d.

FOOD AND CHARACTER. By Louis Berman. Boston and New York: Houghton Mifflin and Company; London: Methuen & Co., 1933. Pp. 368. $2.50 and 12/6d.

It is inevitable that the flood of popularizations of the various aspects of modern science which has descended upon us should bring with it on the one hand masterpieces of elucidation of difficult technical concepts; on the other hand slipshod, hastily thrown together, jazzed up hodgepodges of Sunday supplement enlightenment—and all possible gradations between these extremes.

The two books under scrutiny illustrate this thesis adequately. Doctor Hoskins' book on the endocrine glands and their regulation of the animal (human) body combines sound scholarship and dignified clarity of presentation to such a degree that the medical man and the layman of ordinary intelligence can and will profit from its perusal greatly, the first by a coördination of his previously acquired acquaintance with the subject, the latter from an authoritative introduction to a fascinating field of physiology. Not only will the reader find out the known essential facts concerning the ways and means of the chemical regulation of the body, but he will also advance a long way towards clearing up the countless misconceptions and popular fictions concerning the "glands." The attractive theories of speculation concerning the effects of the endocrines upon character and personality are all duly presented here, but with a critical evaluation of the experimental data upon which they are based. In this field, more than in any other, is there an urgent need for a clear cut, critical delimitation between fact and theory, and further between soundly built theory and fanciful speculation engendered in the prodigious advertising literature of the less scrupulous manufacturers of biological products as well as of the no more scrupulous "gland experts." To the psychologist seeking a reliable source of orientation in this bewildering maze of fact, theory, and fancy Dr. Hoskins' book will undoubtedly prove a veritable boon.

The direct antithesis will be found in the lurid excursions by Dr. Berman, who on the effusive jacket is candidly admitted by the publishers to be the "celebrated gland expert" of the day. In admirable keeping with the above characterization of the author, the latter uses his truly poetic imagination and boldly vivid colors in painting a phantastically simplified and alluring picture of the "body mind" dominated by the ductless glands which in turn appear to be governed by the food we eat. It all reads and sounds so beautifully simple, comprehensible, and, to the reader who has no first-hand acquaintance with the intricacies of animal physiology, so utterly plausible. The plausibility is intensified by numerous quotations from first, second, third, and fourth rate investigators and authorities. But the use of such perfectly respectable references smacks unmistakably of the Evil One quoting the Holy Script for his own

purposes. Nor are the facts of the literature always correctly and critically quoted by the author. A glaring example is found on page 147, where under the heading of "The Need for Salt" the statement appears that "the percentage of salts in human blood is the same as that of the sea water of today as regards sodium, chlorine, potassium and calcium." Actually, of course, sea water contains from five to ten times as much of these mineral constituents as does blood. What Macallum, from whom this statement is probably taken, found on comparing the composition of sea water and of the blood of various species is that the *proportion* of the minerals to each other is fairly constant.

In the ardent enthusiasm for his thesis of the absolute control of the "bodymind" exercised by chemical factors the author accepts and presents to the reader much clinical data which is either unverified or at most only suggestive, as final and unquestionable proof of a dogmatically stated principle. This is illustrated best by the author's use of Dr. Laird's data involving the feeding of high calcium diets to forty-eight "nervous" school children (pp. 156-158). Even on discounting a possible misprint in the following complicated bit of mathematics as: "Three of the twenty-three in the special lime group failed to gain satisfactorily, but about half of those who took the extra milk furnished no evidence of improvement. In other words, eighty-five per cent of the nervous children were markedly improved in a short time by a diet rich in lime," it is very difficult to accept on this limited basis the author's assumption (p. 158) that "calcium and neuroticism are so closely connected."

The breezy journalistic style coupled with his naïve (?) enthusiasm for his own oversimplified system of human physiology and psychology ("bodymind"), indissolubly knit together and governed by a few well defined chemical factors, may either amuse or annoy trained physiologists and psychologists. But the reviewer shudders for the fate of the defenseless lay reader, particularly of the variety susceptible to the authority of the printed word in a book or on a label of a patented food or medicine. Unfortunately the book is intended for the latter, and for such there lurks in it seductive dangers of potent misinformation between covers of learned respectability.

W. A. P.

NIETZSCHE, THE GOOD EUROPEAN. By H. L. A. Visser, LL.D. 1933.

The author defends Nietzsche against the numerous critics who reproach him with lack of method and point out that the mental disease of his later life greatly reduces the value of his previous work.

He thinks that such a general survey of Nietzsche's work is beside the mark, and that only a number of detailed studies, each dealing with a particular aspect of Nietzsche's philosophy, can do justice to the great thinker. He stresses Nietzsche's importance as a good European and a champion of European thought, which in his view is in direct contrast to the most recent German interpretation of Nietzsche's philosophy.

W.-G.

PSYKOANALYSE. By Sigurd Naesgaard. Copenhagen: Funkis Forlag, 1933. Pp. 526.

This voluminous book surveys the present state of the theories of psychoanalysis. The author keeps all the time well within the bounds of the Freudian school and its later devotees, endeavoring to bring to the great public a more or less well-digested summary of the teachings of the said school. From his activ-

ities as lay psychoanalyst, the author quotes various "cases." Here hysterics, obsessional neuroses, depressions, and even melancholias with suicidal tendencies are treated—morbid states which in fact all call for the most skilful attendance by qualified, responsible doctors. The book leaves the reader once more wondering at that fatal flaw in the Freudian structure—in orthodox psychoanalysis most cautiously termed: "The Problem of Lay Analysis"!

OLUF BRÜEL.

WORLD CHAOS. By William McDougall. New York: Covici-Friede. 1932, price $1.50.

In this little book which grew out of the Ludwig Mond lecture before the University of Manchester Prof. McDougall attacks the problem of the world crisis in the light of psychology. Deploring the undue attention devoted to the physical sciences and to materialistic doctrine, he finds one of the chief causes of the present depression the neglect of the mental and social sciences. The author, it is apparent, has given long and careful thought to the world situation and is well equipped with facts.

The foibles of modern life, behaviorism, high-pressure salesmanship, corruption, business engineering and other, largely American, phenomena are passed in review under the searchlight of enlightened criticism.

Many are the passages which will bear quoting. It is Professor McDougall's view that a knowledge of fundamental constitutional differences between races and individuals is essential for the righting of conditions which are leading the world to ruin. Secondly he advocates the development of the social sciences on a psychological basis.

The essay teems with references to and quotations from various leaders in many walks of life both here and abroad, and is remarkably stimulating on the critical side. It is a pity, however, that the author has not gone far enough in his venture so as to demonstrate concretely in what way psychology could have averted the great catastrophe.

Physicists and chemists, on the other hand, may retort that their sciences have been enjoying a well-merited prestige, because the results supplied to the various industries have proven beyond a doubt to be beneficial to the industrialists and public at large, while the mental and social sciences have not manifested their value. The theoretical differences of any science do not concern the layman. What he wishes to know is how to better his lot. When psychologists will be more in agreement amongst themselves, the outsider will repose more confidence in them and their science.

With the general thesis, that psychology is of fundamental importance, probably most educated people will agree, but the question is: who should decide as to which psychology is sound and which unsound? Much of the psychology now being evolved in Germany takes cognizance of racial differences, but probably not in a manner to be acceptable anywhere else but in Germany.

The author hopes that by 1970, the foundation will have been laid for a scientific edifice which will bring to bear all the fruit of earnest and well-directed research on the complex social situation, but what is there to warrant such a scientific family compact forty years hence or even a hundred years, when the tendency of man toward extremes: materialism and idealism, individualism and communism, optimism and pessimism, masochism and sadism, romanticism and realism, etc., is bound to stay with him?

World Chaos is written with verve and is marked by a certain prophetic fervor. Stylistically, it is in Professor McDougall's best vein.

A. A. ROBACK.

Books Received

THE PHYSICAL BASIS OF PERSONALITY. By Ch. R. Stockard. G. Allen & Unwin, London. 12/6d.

SELF-CONSCIOUSNESS AND ITS TREATMENT. By A. A. Roback. Sci-Art Publishers, Cambridge, Mass. $1.50.

MODERN MAN IN SEARCH OF SOUL. By C. G. Jung. Kegan Paul, London. 7/6d.

THE PROGRESS OF MAN. By A. M. Hocart. Methuen & Co., London. 7/6d.

SPEECH DISORDERS. By S. M. Stinchfield. Kegan Paul, London, 1933. 15/-.

DIFFERENZIERUNGS ERSCHEINUNGEN IN EINIGEN AFRIKANISCHEN GRUPPEN. By Sjoerd Hofstra. Scheltema & Holkema, Amsterdam, 1933.

DIE JUVENILE AMAUROTISCHE IDIOTIE. By Torsten Sjögren. Berlingska Boktryckeriet Lund, 1931.

THE PHYSICAL MECHANISM OF THE HUMAN MIND. By A. C. Douglas. E. & S. Livingstone, Edinburgh, 1932.

RECHERCHES PHILOSOPHIQUES PUBLIÉES PAR A. KOYRE, H. CH. PUECH, A. Spaier. Boivin & Co., Paris, 1932-1933.

COMMON SENSE PSYCHOLOGY AND THE HOME. By F. H. Dodd. G. Allen & Unwin, London. 5/-.

CHARACTER IN HUMAN RELATIONS. By H. Hartshorne. Ch. Scribner's Sons Ltd., London and New York. 10/6.

THE PSYCHOLOGY OF INFANCY. By V. Hazlitt. Methuen & Co., London. 5/-.

HOW THE MIND WORKS. By C. Burt, E. Jones, E. Miller, W. Moodie. G. Allen & Unwin, London, 1933. 7/6d.

GOD AND THE ASTRONOMERS. By W. R. Inge. Longmans, Green & Co., London, New York, Toronto, 1933. 12/6d.

THE SCIENCE OF HUMAN REPRODUCTION. By M. Parshley. G. Allen & Unwin, London. 12/6d.

SEX EFFICIENCY THROUGH EXERCISES. By Th. H. van de Velde. Heineman, London. 25/-.

THE NEW PSYCHOLOGY AND RELIGIOUS EXPERIENCE. By Th. Hywel Hughes. G. Allen & Unwin, London. 10/6d.

MAKING LIFE BETTER. By E. Worcester. Ch. Scribner's Sons, London. 7/6d.

PSYCHIATRY AND MENTAL HEALTH. By J. R. Oliver. Ch. Scribner's Sons, London and New York, 1932. 8/6d.

THE EVIDENCE OF OUR SENSES. By A. W. Wolters. Methuen's Monographs on Philosophy and Psychology. London. 2/6d.

PREJUDICE AND IMPARTIALITY. By G. C. Field. Methuen's Monographs on Philosophy and Psychology. London. 2/6d.

THE PSYCHOLOGY OF STUDY. By C. A. Mace. Methuen's Monographs on Philosophy and Psychology. London. 2/6d.

INSTINCT EN KARAKTER. By H. Th. van Wimersma Greidanus. Vonk & Co., Zeist.

FRAUDS AND SWINDLES. By M. C. Moore. Gee & Co., London, 1933. 3/6d.

WAR, SADISM AND PACIFISM. By E. Glover. G. Allen & Unwin, London, 1933. 3/6d.

THE ORGANISM OF THE MIND. By G. R. Meyer. Kegan Paul, London, 1933. 15/-.

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